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ORIGINAL COMMUNICATIONS.

ART. I.—*On the preparation of Magnesia and its Salts from Magnesite.* By E. DURAND.

THE following account of the method of preparing Magnesia from those mineral substances, into whose composition it enters in large proportions, is drawn up from notes which were kindly furnished to me, some years since, by Mr. Lacrota, an eminent manufacturer.

By far the greatest portion of the magnesian preparations, now used in this country, are the products of native skill and industry, a very small quantity being derived from foreign sources. These preparations are obtained from two different sources, and by dissimilar processes, well deserving the attention of the pharmacist. One portion, is afforded by the brine of the large salt works of Massachusetts, but the greatest quantity is produced at the Baltimore chemical works, from a peculiar mineral, very common in many of the serpentine formations of the United States.

In one of the late numbers of this Journal, our worthy president, D. B. Smith, has given an elaborate account of the preparation of the sulphates of Soda and Magnesia at the salt works in Massachusetts, with a rationale of the causes of the

variation in the products of the brine, according as the temperature of the atmosphere is either moderate, or below the freezing point.

The Magnesian products of the Baltimore works are obtained, as above stated, from a mineral very common in many parts of the United States; that employed in these works is found in Hartford county, Maryland, and in Lancaster county, Pennsylvania. This mineral, which is known by the name of magnesite, is considered as a hydrosilicate of magnesia, and contains from thirty-five to forty per cent of magnesia, combined with hydrosilicic acid, oxide of iron, lime, and frequently a small proportion of oxide of chrome, to which the light green colour peculiar to the magnesite, may be attributed; from this magnesite, Epsom salts are prepared in the following manner.

Sulphate of Magnesia.—After grinding the mineral by means of a vertical or horizontal mill-stone, 1000 parts of the powder are treated with 1750 or 1390 parts of sulphuric acid, taken directly from the leaden chambers. These proportions, which depend upon the strength of the acid, according as it is of 30° or 36° of Baumé's areometer for acids, represent about 508 of dry sulphuric acid.

The quantity of acid employed must always correspond with the richness of the magnesite operated on; which should be ascertained by a previous analysis of a small portion of the mineral. As, according to Gay-Lussac, the sulphate of magnesia is composed of two proportions of acid to one of base; when the magnesian earth contains 36 per cent of pure magnesia, 720 parts of acid might be employed instead of 508; but then a larger quantity of oxide of iron would be dissolved, and the reaction would take place much more slowly. It is therefore preferable, as the value of the mineral is trifling, to lose a small quantity of the latter, by using it in excess, rather than to run the risk of having too much acid, and a greater quantity of iron dissolved.

When the relative proportions of sulphuric acid and magnesite are ascertained, the former is first heated in a leaden boiler, provided on one of the sides with an aperture of about

four inches in diameter, perfectly closed with a bung covered with linen rags. The boiler must be large enough to contain three times the quantity of acid employed in the operation, on account of the great effervescence which takes place on adding the magnesite, which is thrown in, by portions of thirty or forty pounds at once, as soon as the acid has acquired the temperature of 212° . It is necessary to stir the mixture incessantly, and to maintain this degree of heat during all the time. The temperature is then increased until the liquid boils, and the ebullition is carried on for ten or fifteen minutes. The bung is now removed and the solution which has the consistence of a light jelly, is received on a brick pavement, surrounded with strong boards, calculated to prevent its spreading farther. It soon coagulates in a mass and becomes hard on cooling. This mass must possess the bitterness peculiar to Epsom salts, without any acid taste; otherwise, it would be an indication that the whole reaction has not taken place, or that the proportion of acid was too great. It is prudent to ascertain this point before emptying the boiler, in order to avoid this disappointment, by protracting the reaction, or adding a new proportion of magnesite.

This mass, which contains sulphate of magnesia, more or less sulphate of iron, and a very small quantity of sulphate of lime, silica &c., is broken to pieces, and introduced into a large reverberatory furnace, and there heated until it ceases to evolve vapours; the mass is then red hot. In the beginning of the calcination, the fire must not be strong enough to melt the saline mass, but only sufficient to make it soft and dry it. It swells considerably, and all the water is soon driven off; when it appears perfectly dry, the heat is increased to redden the furnace. A spongy and light mass of a brick colour* is thus obtained, which, being removed from the furnace, is succeeded by a new portion of the saline mass. A single man may perform from ten to twelve calcinations in twenty-four hours.

This operation is intended to liberate the sulphate of mag-

* This colour is owing to the oxidation of iron.

nesia from a part of the sulphate of iron contained in the mass. Indeed the latter salt is decomposed at a high temperature, and converted into sulphuric and sulphurous acids, which are volatilized, and into oxide of iron. Sulphurous acid is generated by the partial decomposition of the sulphuric acid, which yields to the protoxide of iron a portion of its oxygen, and transforms it into peroxide, by which the whole mass is tinged of a brick colour.

When the mass has become cold, it is thrown into a large tub, half filled with hot water, and there agitated with a large rake, moved by two men, or a stirrer, in order to accelerate the solution of the sulphate of magnesia. As soon as this is accomplished, a solution of sulphuret of lime, 20° of Baumé's areometer for salts, is added to it, by degrees, until it ceases to produce a black precipitate in a small quantity of the filtered saline liquor. The addition of the sulphuret is suspended as soon as the precipitate becomes of a light gray colour. The use of the sulphuret of lime is intended to throw down a new portion of iron; the lime of the sulphuret unites with the acid of the sulphate, forms an insoluble salt, (sulphate of lime,) and the iron is converted into protosulphuret of iron. By adding a larger quantity of sulphuret of lime than is necessary to decompose the sulphate of iron, the sulphate of magnesia would also be decomposed.

The liquor, after having settled, is decanted still warm into large iron kettles, presenting a considerable surface, in order to accelerate the evaporation, which is continued until a pellicle forms at the surface. It is then removed into large leaden crystallizing vessels, where the salt crystallizes on cooling. The mother waters are evaporated to afford a new crop of crystals.

The sulphate of magnesia of the first crystallization, is seldom sufficiently pure to be introduced into the market; it retains, besides a small quantity of sulphate of iron, some impurities which remain suspended in the solution. It therefore becomes necessary to purify it, and this operation is thus performed. The salt, well drained of its mother water, is

removed into a large leaden kettle, heated by steam,* and containing warm water. When saturation is completed, a solution of chloride of oxide of calcium is poured in it, until a small quantity of the filtered liquor ceases to afford any more red precipitate. The greatest care must be taken not to go beyond this point, because the sulphate of magnesia would itself be decomposed. The separation of the sulphate of iron by the chloride of lime, is founded upon the greater affinity of sulphuric acid for lime, which it precipitates from all its solutions, in the state of an insoluble sulphate. The small quantity of sulphate of iron remaining in solution is entirely decomposed, its acid unites with the lime of the chloride; the protoxide of the sulphate of iron is converted into peroxide, by the decomposition of the water by the chloride, which takes up its hydrogen to form hydrochloric acid; and the sulphuric acid having more affinity for the alkaline or earthy metallic oxides, than for those which are not so, the sulphate of iron is entirely decomposed, before that of the magnesia could be acted upon; however, should the chloride be added in excess, the latter sulphate would likewise be decomposed, by the greater affinity of its acid for lime; an insoluble sulphate of lime would be the consequence; even some hydrochlorate of magnesia would be produced by the decomposition of the chloride by water, if the mixture should remain in contact for several days.

When the due quantity of chloride of oxide of calcium has been added to the boiling solution of sulphate of magnesia, the kettle is covered in order to maintain the temperature of the liquid until it has become perfectly clear. The solution is then removed into the crystallizing leaden vessels and left to crystallize. The acicular crystals are drained of the mother water, carried to a drying room, and afterwards sifted and put in barrels. The large crystals coating the sides of the

* The most convenient apparatus consists of a large wooden case sheathed with lead, in which steam is transmitted through a tube plunging in it, and the temperature raised to the boiling point. This box must be sufficiently elevated to permit the liquid to run into the crystallizing vessels.

crystallizing vessels, are redissolved to obtain acicular crystals, and the mother waters evaporated as long as they furnish a sufficiency of crystals.

REMARKS.

The saturation of the magnesia contained in the magnesite, would probably be more prompt and complete, if, as in well directed alum manufactories, the mineral were calcined before hand, in order to deprive it of all its moisture. The calcination might even be carried to redness, without running the risk incurred with the aluminous earth, of being rendered insoluble in the acids. This operation would separate a great part of the iron, which would be converted into the state of peroxide, by the decomposition of the water at a high temperature. The mixture removed from the first kettle, might be received directly into the lixiviating tub containing warm water, and thus, all the labour and fuel necessary to dry the hardened jelly (which is the most unpleasant part of the operation) would be saved, and a larger product obtained: for although the Epsom salt may withstand a very high temperature, there is always a small quantity of it decomposed. The iron should be separated by the means already indicated, by lime water, by the scrapings of the lumps of the carbonated magnesia, by the magnesia in jelly, or by any other means.

The sulphate of magnesia is generally dried in warm and well closed rooms, in which the temperature is raised to a degree sufficient to cause the salt to agglomerate and slightly effloresce. Its exterior appearance is sometimes dull, and deprived of the pearly brilliancy so much desired in commerce. This is very bad management; it is not heat alone which desiccates; it only vaporizes the water, which the air would dissolve and carry off if a current were established; but it can escape only by the fissures of the doors and windows; or a long time and much fuel will be required to raise the temperature to a degree capable of rarifying the air sufficiently to force a passage. These inconveniences would be removed by drying rooms, furnished with a current of heated air; thus a great economy of time and fuel would be afforded, and better products obtained.

There is another sulphate of magnesia in commerce, which is obtained from the bittern of the salt works. This article is seldom pure; all that I have seen, contains more or less hydrochlorate of magnesia, and sometimes in sufficient quantity to render it deliquescent in the air. It is astonishing that the manufacturers have not yet discovered the means of rendering this salt as pure as that made in a direct way, which might be done without any great difficulty.

Principal characters of good Sulphate of Magnesia.—It ought to be white, perfectly dry to the touch; not deliquescent in the air; acquiring a dull whiteness, but without efflorescing after long exposure in the atmosphere; when concentrated sulphuric acid is poured upon it, and the mixture slightly heated, it ought not to evolve hydrochloric acid gas: chloride of oxide of calcium precipitates it in a white powder, but pure bi-carbonate of soda ought not to form any precipitate.

	Water.	Tempera- ture.	Quant. salt dissolved.
Solubility of Sulphate of Magnesia. (Henry and Guibourt.)	100 parts	58.25°	103.69
	100 do.	120.33°	212.61
	100 do.	206.67°	644.44

Carbonate of Magnesia.—To obtain a perfectly white carbonate of magnesia, which does not redden by calcination, it is necessary to employ a sulphate of magnesia entirely free from iron; the minutest quantity of the latter would alter the colour of the magnesia, especially when calcined at a very elevated temperature.

A determinate quantity of sulphate of magnesia is added to cold water, as long as the latter will dissolve the salt: (that is about equal parts.) Should the solution contain any sulphate of iron, this must be decomposed either by chloride of lime, or by the hydrosulphate of ammonia. When the liquor has become perfectly limpid, it is decanted in a wooden tub heated by steam, and on 100 parts of Epsom salt employed, a solution of 125 parts of crystallized carbonate of soda is added. The mixture must be agitated rapidly, so as to prevent the formation of lumps, which otherwise would require a long time to divide, and an increased number of washings. The whole is heated to 170° to expel any excess of carbonic acid, by

which some magnesia is retained in solution. When the carbonate has settled to the bottom, the clear liquid is decanted and the precipitate washed two or three times in filtered tepid water, holding in solution a small quantity, say a half per cent, of potassa or soda, to precipitate the small quantity of salt of lime which it might contain, and afterwards with cold water. The two last washings, or at least the last one ought to be made with distilled water. The first waters are evaporated, and afford handsome crystals of sulphate of soda.

When the last washings do not any longer precipitate with a salt of baryta, the carbonate of magnesia is placed in large linen filters, where it is permitted to drain for twenty-four or forty-eight hours. If destined to form lump magnesia, it is placed in wooden moulds without bottoms, resting on an absorbing substance; either large bricks moderately burnt, or upon gypsum. The soft carbonate is slightly pressed with a piece of wood, or a square piece of sheet iron of the size of the mouth of the moulds, in order that they may be perfectly filled up with magnesia, and that no vacuum be left. As soon as the lumps can be removed from the moulds, they are turned upper side down, in order that the absorbing body may attract as much of the water, and as quickly as possible; and the particles of magnesia be thus prevented from aggregating together by their own weight. On the celerity of this operation, and the speedy desiccation of the lumps in the drying room, depends, in a great measure, the lightness of the carbonate of magnesia. When it is perfectly dry, every lump is presented, (each of its faces alternately,) to the surface of a metallic sieve, revolving with velocity by the same mechanism as a grinding stone, or the lathe of a turner. Thus the carbonate of magnesia is freed from all the foreign matters which may have soiled its surface during dessication, and rendered perfectly smooth. All the moulds must be of white wood and kept perfectly clean.

Calcined Magnesia.—It is useless to put the carbonate of magnesia designed for calcination into moulds. It is only removed from the filter upon which it has drained and carried to the drying room, where it is spread over frames covered

with linen and then dried quickly. In that state, it is introduced into cylindrical earthen ware pots, slightly burnt and furnished with their tops or covers well luted with clay. These pots are thus placed in the furnace of an earthen ware manufactory. In this way a magnesia perfectly deprived of its carbonic acid is obtained at a trifling expense of calcination. The same pots may be used several times.

This calcined magnesia is generally very light, and in my opinion, highly preferable for therapeutical exhibition to Henry's magnesia. It dissolves very easily in the weakest acids, whereas, that of the English chemist, which is however very pure, is only soluble in a tolerably concentrated acid. It is much less absorbent, and better calculated to saturate the very feeble acids of the stomach.

M. Robiquet was not mistaken in his opinion, that the unctuousness peculiar to Henry's magnesia, was owing, in a great measure, to the high temperature to which it had been submitted; this is not, however, the only cause of this property, which depends more particularly on the nature of the subcarbonate employed for its precipitation. When the sulphate of magnesia is decomposed by the carbonate of soda, the calcined magnesia is much softer to the touch, than that afforded by the carbonate of potassa. This is easily explained: First, by the great difficulty in separating the last portions of the sulphate of potassa, resulting from the decomposition: Second, on account of the silica and alumina which are constantly contained in the carbonate of potassa, and are thrown down with the carbonate of magnesia, to which they communicate a roughness that the same article precipitated by soda has not. The purity of the sulphate of magnesia and of the water employed as solvent, contributes also to impart this property. If the former contains any muriate of lime, (chloride of calcium,) and the latter any sulphate of lime, the base of both these salts will be precipitated in the state of carbonate.

A pure magnesia, heavy, very soft to the touch, and in every respect, similar to Henry's magnesia, may be obtained by the following process:—The carbonate of magnesia, before being perfectly dry, is introduced into a square box with-

out a bottom, made with strong boards firmly joined together by iron hoops; it is pressed as much as possible with the hands, and a strong piece of board so adjusted as to enter easily in the case, is put over it, and subjected to the power of a press in order to reduce the volume of the magnesia. The square mass which has thus been produced, is placed in a crucible of refractory bricks of such capacity and form as to be exactly filled up by the lump of carbonate of magnesia; the cover is then adjusted and luted with wetted magnesia, and the whole heated to white heat. A lump of thirty or forty pounds requires at least eight hours of calcination. When the calcined magnesia is sufficiently cooled, it is sifted through a fine sieve.

If the crucible contains no or very little metallic oxide, the product will be perfectly white, heavy, very soft and unctuous to the touch, mixing well with water on account of its specific gravity which is ten times greater than that of the calcined magnesia prepared without being pressed and at a lower temperature. It is sparingly soluble in the weak acids, and in every respect similar to that so much extolled, of the English chemist. A product nearly similar is obtained, by pressing as much as possible the carbonate of magnesia in earthen pots, without the aid of the press.

The colour of the calcined magnesia depends very much on the purity of the earth employed in the manufacture of the crucibles; if they, or even their covers, contain any oxide of iron, the magnesia, however pure it may be, will be penetrated even to the centre of the mass by a very small quantity of that oxide, but this quantity will be sufficient to communicate to it a light pink appearance. This tint will sometimes be perceptible even in the third calcination. It would, consequently, be advantageous, when this process is to be performed on a large scale, and the operator wishes to obtain a fine article, to procure crucibles or bricks containing neither iron nor manganese.

ART. II.—Process for preparing Gallic Acid. By DAVID STEWART, of Baltimore.

HAVING been for some time engaged in the preparation of Gallic Acid, and being successful beyond my expectations in preparing and purifying that article, I have been induced to make public the processes which I have selected for so doing, hoping that some one may benefit by an experience which has cost me some trouble and research. On the 15th of October, I infused four pounds of coarsely powdered gall nut in about two gallons of cold water, stirred the mixture at intervals until the 20th, when the dregs were separated from the infusion by a cloth. These dregs were macerated in four pints of water, separated from the infusion thus formed, and pressed. The liquids when mixed were suffered to fine, decanted from the sediment, and set aside in a glass jar covered with paper. On the 21st of December, (nearly two months having elapsed,) a quantity of impure gallic acid had crystallized throughout this infusion, which, when separated from the mother water by a cloth and dried, weighed 7 oz. As the temperature to which the infusion had been exposed would not have averaged much more than 40° , I again set it aside, and toward the expiration of two months obtained $7\frac{1}{2}$ oz. more of the acid, which added to the former product amounted to $14\frac{1}{2}$ oz.

To free this from the elagic acid and other insoluble matter with which it precipitates, it should be powdered and thrown into about four times its weight of boiling water. To effect the solution of all the gallic acid, the mixture should boil for a few moments, and then be filtered while at the boiling temperature. When the filtered liquid has cooled, it will deposite the gallic acid in yellowish white crystals. To free these from colouring matter, it is necessary to separate them from the mother water, by pressure in a cloth, and throw them into eight times their weight of boiling water, with one fifth their weight of animal charcoal, (purified by muriatic acid.) This mixture, when boiled and filtered as the former one, will afford a much more colourless solution, which, upon cooling, will concrete into a mass of white crystals of gallic acid.

Gallic acid when obtained by this last process is nearly pure, and it may be freed from the tannin which still adheres to it by sublimation, but, as it is so easily decomposed by heat, this will be found a very tedious and difficult process; moreover, when sublimed, gallic acid is found to possess different properties from the unsublimed acid. A knowledge of these facts led me to adopt another means of purifying this acid, which is at once easy and expeditious.

The crystals obtained by this last mentioned process were powdered, and separated from their water of crystallization by a carefully regulated temperature. The powder was then thrown into boiling alcohol, (at 40° Baumé.) This mixture was suffered to boil for a few minutes, and then filtered while boiling hot. The alcohol, which I used, was rendered strong by means of a bladder. The quantity of alcohol used should not exceed double the weight of the acid to be operated on. It is also necessary that the alcohol be anhydrous, for when in this state it does not dissolve the tannin, but that substance is rendered soluble in it by a very minute quantity of water. I would also suggest that the alcoholic solution should be filtered immediately, into four times its bulk of boiling water, as it does not crystallize so regularly from the alcoholic solution, being destitute of water of crystallization.

By a careful evaporation of the mother waters, fresh crops of crystals may be obtained, which should be purified as the former products. The crystals, particularly from the last process, should be excluded from the light while drying.

ART. III.—*On the Alum and Copperas Manufactory of Cape Sable, Maryland.* By E. DURAND.

WE extract the following account of the Alum and Copperas Manufactory, formerly conducted by Dr. G. Troost, at Cape Sable, Maryland, from a letter of our associate Mr. E. Durand, written to a friend of his in 1817:—

These works are situated on a cape of the Chesapeake Bay,

at the mouth of Magothy river, about twenty miles from Baltimore and six from Annapolis. The soil is alluvial, sandy and unfit for cultivation. The trees about the establishment are principally of the fir tribe; but there are, however, in the neighbourhood, tracts covered with different species of oak, some chestnut and tulip trees of immense size. All the springs are more or less impregnated with sulphates of iron and alumine.

The works at this time of the year (month of May) being in full operation, and having had for these two months past the opportunity of witnessing all the processes, I will attempt to give you a description, first, of the materials from which alum and copperas are obtained, and, afterwards, of the different operations to which these materials are submitted before the products can be introduced into commerce.

Under a stratum of sand, and resting upon an impermeable crust of ferruginous sand stone, lies, imbedded in a layer of almost pure alumine about six feet thick, a forest of pine trees, thrown down by some ancient convulsion, and which has apparently remained for centuries under water. The crust, which forms the base of this aluminous layer, is a little below the level of low tides and is of considerable hardness; the labourers take good care not to break it, otherwise the water gushes out and inundates the works. This remarkable formation extends to a considerable distance.

The pines imbedded, seem to belong to the same species that now cover the soil, and are converted into lignites, more or less impregnated with sulphuret of iron. All the pieces which I have examined present this singular phenomenon: The central parts are generally transformed into pure metallic sulphuret, sometimes exhibiting in the hollow parts beautiful octohedral crystals of a yellowish metallic lustre and great hardness. The more remote the ligneous layers from the centre, the less they are saturated with sulphuret of iron. The external rays, as well as the cortical layers, are generally pure lignite, some compact and black, others retaining the colour and friability of rotten wood. In some instances, their texture seems to have suffered but little alteration; the central

system, concentric rays, the bark and knots being perfectly discernible; even fruits are occasionally found in a pretty good state of preservation as to form.

About fifty slaves are employed in these works; some in digging the materials, others in carrying them to the sea shore, where they are piled up in large heaps, with intermediate layers of wood, afterwards to be burnt. Another set of men transport the ashes afforded by previous combustions, to the lixiviating hoppers, whilst a few of the most intelligent are employed in the laboratory, under the superintendence of an overseer.

The lignites and aluminous earths being piled up together with alternate layers of wood, as aforesaid, a fire is kindled in different parts of the mass, and the whole is suffered to undergo a slow combustion. The pyrites are decomposed, and sulphuric acid formed, which, coming in contact with the alumine and the ashes of the wood, forms a double sulphate; but at the same time, a much larger quantity of simple sulphate of alumine, and some protosulphate of iron are produced. This latter salt, however, is nearly all decomposed during the process of combustion, giving rise to a new production of sulphuric acid, and consequently, to more sulphate of alumine. The protoxide of iron is thus transformed into insoluble peroxide. The combustion lasts for months, during which period such a quantity of sulphurous vapours are lost in the atmosphere, as to vitiate it powerfully in a compass of several miles around the establishment.

When the whole is consumed, the ashes are removed to large hoppers, and there lixivated. When the ley is sufficiently saturated, it is transmitted to large boilers and evaporated to a certain degree; sulphate of potassa or potassa itself, in determinate proportions is then added, and the liquor carried to about thirty-six degrees of Baumé's areometer. The fire is now removed, and the solution, after being permitted to settle for a while, is transferred to the crystallizing vessels, where, on cooling, almost all the alum is deposited in an impure state. The mother liquor is added to a new quantity of ley, and the same process is repeated successively,

until all the ley obtained from the hopper is exhausted. When the mother liquor seems too highly impregnated with the salts of iron, it is thrown into the hopper to undergo decomposition under the influence of the air. The alum obtained by this process, is recrystallized two, and occasionally three times, in order to obtain it in a state of sufficient purity for commercial purposes. The quantity produced weekly is from six to eight tons.

Besides the manufactory of alum, a large quantity of sulphate of iron is also produced by a very simple, but long process. The large pyrites, undecomposed by combustion, or obtained directly from the clay, are piled up on a sloping surface, surrounded by a trench, and are thus abandoned for a considerable time to the atmospheric influence. They are slowly decomposed by the action of the air and moisture, and converted into sulphate of iron, which appears on the surface in the form of a white efflorescence. This salt is dissolved by the rain and by the water which is occasionally sprinkled over it and carried into the trench, where, by spontaneous evaporation and redissolving the efflorescence, (as it is generated,) with the solution already contained in the trench, the liquor acquires a considerable degree of concentration. In that state it is carried to the boilers, evaporated to 35° or 38° and left to crystallize.

How such an amazing quantity of sulphuret of iron accumulated in these lignites, is beyond my comprehension. What afforded its constituents; it being evident that neither the wood nor the clay in which it was imbedded contained them? Are iron and sulphur simple or compound bodies? These are all mysteries which it is not yet in the power of chemistry to solve. But however it may be, on considering attentively all that surrounds me at the present moment, I cannot help regarding them as formed of elements as yet unknown to us, which are capable of acting on each other at great distances, and of forming new and more complex combinations, under peculiar circumstances, perhaps by the agency of electricity!

Another circumstance worthy to be mentioned, as charac-

terizing this interesting deposit, is the occurrence of amber. Some pieces have been found as large as the fist; generally, however, very impure; but I have seen some pieces in Dr. Troost and my friend Mr. Julius Ducatel's collection, as beautiful and transparent as the amber of the Baltic. Nodules of amber surrounding what appears to have been the twigs of trees, have been picked up, and what is very singular, they exhibit regular perforations, bearing evidence that they are the work of an insect; in some of these, small insects of an extinct species, are even perceived. These nodules may be compared to nut galls, though generally larger.

Is amber an animo-vegetable substance, which has subsequently become mineralized under peculiar circumstances? Here is another question to be answered by chemists and mineralogists.

ART. IV.—*Remarks on the Neutral Mixture.*

By JOS. SCATTERGOOD.

No reader of this Journal, I presume, will question the great importance of uniformity in the strength of all our medicinal preparations, and that the physician who disregards this very essential point in the articles he may administer, will be continually liable to disappointments and inexplicable difficulties.

The great celebrity of the diaphoretic preparation called neutral mixture, and, consequently, the frequent applications apothecaries have for it, renders it highly important to the success of the physician, as well as the character and convenience of the apothecary, that a formula should be agreed upon, which would render it, what all admit it is not *now*, of uniform strength.

I trust no improper motive will be attributed to me if I attempt to show that this popular and highly useful article is daily prescribed by our physicians, of a diversity of strength they are not perhaps aware—in order to do which, it will

only be necessary to copy a few of the principal formulæ that most are daily compounded. The four following are those generally used:—

No. 1.—R. Succi Limonis Recentis, \bar{z} ij.

Potassæ Carbonatis q. s. ad. saturand.

Sacch. alb. \bar{z} ij.

Aquæ \bar{z} ij.

No. 2.—R. Succi Limonis Recentis, \bar{z} iv.

Potassæ Carbonatis q. s. ad. saturand.

No. 3.—The Juice of 2 Lemons.

Potassæ Carbonatis q. s. ad. saturand.

Sacch. alb. \bar{z} ij.

Aquæ, \bar{z} ij.

No. 4.—Potassæ Carbonatis, \bar{z} iss.

Succ. Limon q. s.

Sacch. alb. \bar{z} ss.

Aquæ from 4 to 6 oz.

The above are given in the same doses, although they all vary in strength. The second is double that of the first, the strength of the third will depend entirely on the quantity of the juice yielded by the lemons, the product of which is very uncertain, some yielding an ounce and a half, others not more than half an ounce, according to their size, age, &c. The fourth, independent of containing two or three times as much water as any of the rest, will be liable, in common with all the others, to vary with the strength of the juice, in which a difference of upwards of 20 per cent. is often observed. This peculiarity of the juice will always render its employment objectionable, when uniformity of strength is regarded. The resulting compound of all these formulæ is a solution of citrate of potassa, more or less diluted and mixed with the coagulable mucilaginous matter of the lemon juice, to get rid of which is always attended with more or less difficulty and inconvenience.

It would be considered strange indeed, at the present day if a physician should order the apothecary to saturate a given quantity of dilute sulphuric acid with magnesia, whenever he wished to administer a dose of Epsom salts; and yet the prac-

tice of making the neutral mixture extemporaneously is not less unscientific and useless. The citrate of potassa when crystallized, is as definite a compound as sulphate of magnesia or any other salt, and as such should certainly be used for preparing mixtures, of which it is a main constituent. Fifty grains of citrate of potassa, dissolved in one ounce of water, will be found to be about equal to one ounce of lemon juice, (of average strength,) saturated with potassa, and hence a preparation as follows may be substituted in all cases where the neutral mixture prepared with fresh lemon juice is admissible; and has the advantage over it of being *uniform* in strength, clear of *inert* matter, and readily made at any time, while it is equally agreeable to the taste.*

R. Potassæ Citras $\mathfrak{z}\text{v}$.

Loaf sugar, previously rubbed on fresh lemon peel,
or with a drop or two of ol. lemon on it, $\mathfrak{z}\text{ss}$.

Water $\mathfrak{z}\text{vj}$.

If, however, notwithstanding the above considerations, this mixture is still to be extemporaneously prepared, crystallized citric acid is certainly the only thing the accurate scientific physician should employ. It is uniform in strength, is very soluble in water, and of an agreeable taste. The following formula (substituting the bi-carbonate† for carbonate of potassæ, and adding a little sugar,) given in the U. S. Dispensatory is a good one, and will be found to make a much more satisfactory mixture in every respect than any prepared with lemon juice:—

Citric acid $\mathfrak{z}\text{ij}$.

Ol. limon m. i.

Potassæ bi-carb. q. s. ad saturand.

Aquæ $\mathfrak{z}\text{iv}$.

A more agreeable though rather more troublesome mode

* A few grains of citric acid, say 10 grs. to the quantity ordered above, would render it still more agreeable to many palates.

† The common salt of tartar of commerce being the only carbonate of potash generally kept in the shops, and containing impurities, the bi-carbonate is therefore preferred.

of administering the ingredients of the neutral mixture, is to dissolve them separately, so that they may be mixed at the bed side and drank during effervescence. This constitutes the well-known preparation commonly called the effervescing draught. For the formation of this draught the following powders will be found a certain and convenient mode; they may be carried with more convenience, and will be found altogether more manageable than the liquids necessary to form it, particularly where lemon juice is used, this being often so weak as scarcely to decompose the carbonate of potassa. They may be kept put up as the sodaic and seidlitz powders are, with directions for their use—the acid in white, and the bi-carbonate of potassa and sugar in blue paper:—

Powdered citric acid $\mathfrak{z}\text{i}$.

Bi-carb. potassa 3ss.

Sugar, previously rubbed on lemon peel, or scented with ol. lemon 3ss.

ART. V.—On *Officinal Tinctures*, by JOSEPH BRINGHURST, Wilmington, Delaware.

IN compliance with the requisitions of the College of Pharmacy, I have given as much attention to the subject of tinctures &c. as my health and occupations have permitted; and now present a table of tinctures and extracts, from actual experiments.

In all the trials with the tinctures, a French vial, with a long ground stopper, was used; this was filled with the tincture, the stopper pressed in, and the whole surface carefully dried before weighing. The alcohol employed was diluted to 21° Baumé, at a temperature of 65° F. The vial when empty, weighed fifteen drachms, thirty grains; when filled with the diluted alcohol, the weight was two ounces, five drachms, five grains. By comparing this with the weight of the vial when filled with the tinctures, the difference will be readily ascertained.

The extracts shew the quantity of the articles really held in

the menstruum, though whether I have been accurate in the weight of the menstruum displaced, will deserve further examination.

ARTICLES.	Quantity.	Menstruum.	Weight of vial filled with tincture.	Dry extract.	Weight added to the menstruum in tincture.	Weight of menstruum displaced by the solution of the material.
Pure Opium, Pulv. Valerian, Do.	gr. 75	Alcohol diluted.	3 3 gr. 2 5 15 2 5 12	gr. 21 9 9	gr. 11 7 5	gr. 10 2 4
Gum Guaiac. Do.	3 iij	" " 36°	2 5 23 2 4 54	63 55	19 20	43
Aloes, Pulv. Myrrh, Do.	3 iij	" diluted.	2 5 9 2 5 10	9 16	4 5	5 11
Scillæ sic (white) Cinchon flav. Serpentar rad.	3 iij 3 iij 3 iij	" " "	2 5 54 2 5 23 2 5 14	15 36 18	5 18 19	11 18 18
Lupuline (trench) Digitalis, Cantharis, Quassia, Spigel rad. pulv. Pulv. Jalap,	3 iij 3 iij 3 i 3 iij 3 iij 1 lb.	Alcohol 36° " diluted. " " " " " " " " " †	2 4 56 2 5 12 2 5 9 2 5 5 1 lb.	30 21 6½ 16	22 7 4	no change. 12 14 2½

* Digested two days, in a closed bottle, at a temperature of 110° to 120°, with alcohol at 36° 3fe vi, and water 3fe xxiv.

† Alcohol diluted to 22° Baume, one and a half gallons, digested five days, at a temperature of 120°. Employing by degrees 3xi of subcarb. sod. in crystals. This yielded 3viiss extract, suitable for pills.

ART. VI.—Patent Medicines.

ONE of the earliest efforts of the College of Pharmacy was an attempt to reform the recipes for the preparation of some of the Patent Medicines in common use. The confusion

into which these had fallen, for want of some authoritative standard, was productive of serious evils; and as it is believed that the attempt was in great measure successful, we republish the report of the committee by which the task was performed.

Proceedings of the Philadelphia College of Pharmacy, and of the Board of Trustees, on the subject of the older Patent Medicines.

At a meeting of the Board of Trustees of the Philadelphia College of Pharmacy, held May 21st, 1822 :—

Resolved, That the communication from Solomon Temple relative to Patent Medicines, which was presented at a former meeting, be read, when the following resolutions (attached to the communication) were offered and agreed to :—

1. *Resolved*, That a committee be appointed to select from such prescriptions for the preparation of Patent Medicines and other compounds, as may be submitted to them by the members of the college, those which in their opinion, may be deemed most appropriate for the different compositions, which, after having carefully compared with others to which the committee may have access, and altered in such a manner as may appear advisable, they shall submit when prepared to the Board of Trustees for their approbation, with a view of laying the result before the college for final adoption, as the standard formulæ for the use of its members.

2. *Resolved*, That the members of the college be requested to place at the disposal of the above committee, all such recipes for the preparation of Patent Medicines as they may be willing to communicate.

3. *Resolved*, That the above committee be instructed to consider whether any, and if any, what alteration or modification of the directions which accompany the Patent Medicines can with propriety be made at this time.

Solomon Temple, Daniel B. Smith, Charles Allen, Warder Morris and Dr. Samuel Jackson were appointed the committee.

PETER WILLIAMSON,
Secretary to the Board of Trustees.

At a meeting of the board of trustees, Second month (February) 23d, 1824:—

The committee on Patent Medicines made the following report, which was read and laid over for further examination at next meeting.

At a meeting of the board of trustees, Third month (March) 16th, 1824:—

The further consideration of the report of the committee on Patent Medicines was taken up, and it was on motion accepted and recommended to the college for approbation and adoption, as the standard formulæ for the use of our members.

SOLOMON TEMPLE, *Secretary.*

At a stated Meeting of the Philadelphia College of Pharmacy, held Third Month (March) 30th, 1824:—

A report of the committee of the board of trustees on the subject of Patent Medicines, was laid before the college and read; and upon motion referred to a special committee for examination.

Committee, Charles Allen, Daniel B. Smith, Warder Morris, Edward B. Garrigues, and William Baker.

At an adjourned meeting, held Fifth month (May) 4th, 1824:

The committee appointed to examine the report on Patent Medicines submitted by the trustees, reported the same with a few alterations, which was upon motion accepted: and the formulæ are recommended to the adoption of members as the standard recipes of the college.

Upon motion resolved, that the board of trustees be directed to furnish each member with a printed copy.

DANIEL B. SMITH, *Secretary.*

At a meeting of the board of trustees, Fifth month (May) 18th, 1824:—Stephen North and William Baker were appointed a committee to procure the printing of two hundred and fifty copies of the recipes for Patent Medicines, in conformity with the resolution of the college.

SOLOMON TEMPLE, *Secretary.*

To the Trustees of the Philadelphia College of Pharmacy:—

The committee to whom was referred the subject of the Patent Medicines, having investigated it, report, that as preliminary to the proposed reform, they have procured from many members of the college, and from other sources, a considerable number of recipes for eight of the Patent Medicines most in use, to which they have confined their attention. These recipes differ so much from each other, as to render a reformation in the formulæ absolutely necessary, and the task of reformation a very difficult one. In some of the recipes for the same medicine, for instance, there are not two articles alike, and the quantity of opium in Bateman's drops varies from one to nearly fourteen parts in a thousand parts of the liquid.* These variations have crept in, no doubt, partly through errors in transcribing the recipes, partly through imitations of the original medicine, made to answer the intention and resemble it in taste and appearance, and partly through attempts at reformation, made from a conviction of the want of authenticity in the recipes in use.

It would be desirable in all cases to ascertain the original formula of the medicine, but though many of the recipes claim to be true and genuine, we have placed no confidence in them as such: for we have seen them differing very much from each other, and with equal claims to genuineness. We are persuaded also that the specifications of the patents filed at the Office of Rolls, (of which these recipes profess to be copies) serve only to mislead. An official copy of the specification of Turlington's Balsam of Life, will satisfy every member of the board, that the medicine either never was prepared thereby, or that it would be absurd with our present skill in pharmacy to revert to such an original.†

* The committee presented, with their report, an extensive table exhibiting the relative proportions of each of the numerous articles employed in the preparation of these medicines, according to the different recipes which they examined.

† Recipe for Turlington's Balsam of Life, taken from a certified copy of specification, as filed in the Office of Rolls, in London.

Gum Benzoin	5 lb.	Gum Elemi	7 lb.
Storax	5 lb.	" Guaiac.	3 lb.
Balsam Tolu	1 lb.	" Arabic	8 lb.

—Without seeking, therefore, to ascertain the true and original recipe, the committee have attempted a reform in these medicines, according to the following views:—

1. To form a medicine possessing the chief compatible virtues, ascribed to it in the usually accompanying directions.
2. To approach as near as is consistent with this design to the recipes in common use, rejecting inert and superfluous articles.
3. To make the strength of the medicine correspond with the doses ordered in the direction.
4. To direct in their composition articles which are easily procured genuine, and of a price such as not to hold out a temptation to alter or adulterate the medicine.

1. HOOPER'S FEMALE PILLS.

These pills were originally designed, and are constantly used as cathartic and emmenagogue. The different recipes vary so much that aloes is the only article contained in them all. The committee have selected the Extract of Hellebore, the Sulphate of Iron and the Myrrh, as the best emmenagogues; Aloes as the cathartic basis, Ginger and Canella alba as aromatic correctives, and Soap as an adjuvant, and affording an eligible form. The fetid gums which are contained in many of the recipes are rejected as being antispasmodic rather than emmenagogue; the Extract of Savin as difficult to procure, and as necessarily injured in its preparation; the Ivory black as a clumsy and barbarous ingredient; and the remaining articles in the tables, as either inert or superfluous. The following recipe is submitted for the consideration of the trustees:

Balsam Peruv.	5 lb.	Cort. Cinnam.	2 lb.
Aloes Socot.	2½ lb.	" Winteran.	1 lb.
Myrrh	6 lb.	Caryophyllæ	1 lb.
Gum Oliban.	1½ lb.	Nuces Moschat.	½ lb.
Rad. Angelicæ	1 lb.	Gum Juniper	1 lb.
Sem. Coriand.	1 lb.	Crocus Sativ.	1 lb.
" Fœnic. Dulc.	1 lb.	Macis	¼ lb.
" Cardamom.	1½ lb.	Oleum	8 lb.
" Anisi	1 lb.	Herb. Hyperici	8 lb.
" Urticæ	1½ lb.	" Althæ	4 lb.
Gum Mastich	1½ lb.	Spts. Vini Rect.	q. s.
Distil and digest in a sand heat.			

RECIPE.

Aloes Barbadosis	℥viiij	400
Ferri Sulphatis Exsiccati	℥ii 3iss	
Vel Ferri Sulphatis crystal	℥iv	200
Extracti Hellebori Nigri	℥ij	100
Myrrhæ	℥ij	100
Saponis	℥ij	100
Canellæ in pulverem tritæ	℥j	50
Zingiberis in pulverem tritæ	℥j	50
		<hr/> 1000 parts.

Beat them well together into a mass with water, and divide into pills, each containing two and a half grains.

2. ANDERSON'S SCOT'S PILLS.

These pills are a mild aloetic purgative, with which, according to the judgment or fancy of the preparer, various adjuvants are combined. The formula submitted by the committee will, it is presumed, be liable to as few objections as any.

RECIPE.

Aloes Barbadosis	℥xxiv	787
Saponis	℥iv	131
Colocynthis	℥j	33
Gambogiæ	℥j	33
Olei Anisi	f. 3ss	16
		<hr/> 1000 parts.

Let the aloes, colocynth and gamboge be reduced to a very fine powder, then beat them and the soap with water, into a mass, of a proper consistence to divide into pills, each containing three grains.

3. BATEMAN'S PECTORAL DROPS.

More important errors have crept into this recipe than into any other. The quantity of Opium in one formula is $7\frac{1}{2}$ grs. and in another 106 grs. to the pint. The Camphor varies still more. Castor is introduced into many of the recipes in place of Catechu, which appears to have been an original ingredient,

and which it in no way resembles. The intention seems to have been to form a narcotic and astringent, possessed of diaphoretic and diuretic qualities. Such an intention will at least best answer the purposes for which the medicine is now used, and for which it is chiefly recommended in the printed directions. The formula submitted by the committee, contains half a drachm each of opium, camphor and catechu in a pint, or about a grain of each in half a fluid ounce of the liquid. It contains an equal quantity of opium, with the elixir paregoric or opiated tincture of camphor of the American Pharmacopeia.

RECIPE.

Alcoholis diluti	Cong. iv	1000 parts.
Santali Rubri Rasi	3ij	31.25
Digest for 24 hours, filter and add		
*Pulveris Opii	3ij	31.25
Pulveris Catechu	3ij	31.25
Camphoræ	3ij	31.25
Olei Anisi	f.3iv	7.81

Digest for ten days.†

* Vel tincturæ opii Oij et alcoholis diluti cong. iij Ovj.

4. GODFREY'S CORDIAL.

The quantity of opium in this mild and much used narcotic varies in a very dangerous degree. Some of the recipes contain 4.46 parts, and others only .92 parts of opium in 1000 parts of the liquid. The printed directions state that a large tea spoonful is the dose for a child one year old. Supposing the proper dose of opium for such a child to be the twelfth part of a grain, the quantity contained in 1000 parts of the liquid would be 1.39. As this is however much below the average quantity in the recipes, the committee have adopted

† In the original preparation, the undissolved residuum was kept agitated in the mixture while bottling off, so as to form a sediment in each bottle. The virtues of the opium and catechu are entirely extracted by proof spirit, and the circumstance is merely mentioned that those who wish may preserve the appearance of the original. The colouring used for the artificial brandies may be substituted with advantage for the red saunders in the proportion of three ounces to the gallon.

the proportion of 2.08 to 1000; according to which a grain of opium is contained in an ounce, or two table spoonful of the liquid, which is the dose for an adult ordered in the printed directions. The salt of tartar, which is found to be very useful as an antiacid, is retained in the proportion of one and two thirds of a grain to the ounce; and the oil of sassafras is adopted as being the carminative which has become one of the chief features in the medicine. The molasses should be that of the sugar refiners, and the composition should contain enough of it to resist fermentation.

The following formula, adopted with these views, is submitted:—

RECIPE.			
Tincturæ Opii	O iss	34.5	} 1000 parts.
Syrupi Nigri	O xvj	367.8	
Alcoholis	O ij	46.	
Aquæ	O xxvj	551.7	
Carbonatis Potassæ	ʒiiss	57.5	
Olei Sassafras	f. ʒiv	11.5	

Dissolve the salt of tartar in the water, add the molasses, and heat over a gentle fire till they simmer; take off the scum which rises, and add the laudanum and oil of sassafras, having previously mixed them well together.

5. DALBY'S CARMINATIVE.

The printed directions for this mild carminative and laxative, order it in doses of a tea spoonful for children, of from one to two years old, and of two table spoonful for an adult. These doses indicate the proportion of opium to be about a grain to the ounce, which the committee have accordingly adopted. The formula proposed by them contains also thirty-three grains of magnesia, and one and a half grain of salt of tartar to the ounce. This composition they think is well adapted to the doses, and for the diseases mentioned in the printed directions. The combination of essential oils which they have proposed, forms a milder and more grateful carminative than the same quantity of either taken alone. Several of the recipes contain the tincture of castor and assafœtida, which are no doubt occasionally useful, in the cases in which

this medicine is prescribed. Both on account of their nauseous taste, and because the intention in this preparation seems to have been to form a carminative rather than an antispasmodic, we have omitted these tinctures. The following formula is proposed by the committee:—

RECIPE.

Aquæ	O x	1000 parts
Sacchari Albi	3xxxij	200
Carbonatis Potassæ	3ss	3.125
Carbonatis Magnesiae	3xij	75.
Tincturæ Opii	f. 3vj	37.5
Olei Menthæ Piperitis	f. ʒij	.5
Olei Carui	f. ʒij	.5
Olei Anethi Fœniculi	f. ʒij	.5

Triturate the essential oils with the sugar and magnesia, and then add the remainder.

6. TURLINGTON'S BALSAM OF LIFE.

The committee have taken as the basis of their formula, the compound tincture of Benzoin of the pharmacopeias, to which they have added Balsam of Peru, Myrrh and Angelica root. The following recipe, affords, they think, an elegant and rich balsamic tincture:—

RECIPE.

Alcoholis	O viij	1000 parts.
Benzoini	3xij	93.75
Styracis Liquid	3iv	31.25
Aloes Socotrinæ	3j	7.8125
Balsam. Peruviani	3ij	15.625
Myrrhæ	3j	7.8125
Radici Angelicæ	3ss	3.90625
Balsam. Tolutani	3iv	31.25
Extracti Glycyrrhizæ	3iv	31.25

Digest for ten days and strain.

7. STEER'S OPODELDOC.

The committee have adopted, with slight variations, the Linimentum saponis of the old London dispensatory. They

have added Aqua ammonia, which is contained in several of the recipes in the table, and is an excellent addition; and have substituted for the oil of Origanum the essential oil of the *Monarda punctata*, a native plant nearly resembling it in odour, though more stimulating, and more readily to be procured genuine. In preparing this tincture, it is necessary to use soaps made with animal fats, if we wish the preparation to remain solid. The soaps made with vegetable oils, form solutions in alcohol that remain liquid at the common temperature.

RECIPE.

Alcoholis	O viij	1000 parts.
Saponis Albi	$\frac{3}{5}$ xx	156.25
Aquæ Ammoniæ	f. $\frac{3}{5}$ iv	31.25
Camphoræ	$\frac{3}{5}$ viij	62.5
Olei Rosmarini	f. 3j	7.8125
Olei Monardæ	f. 3j	7.8125

Dissolve the soap in the alcohol with a gentle heat, add the remaining articles, suffer the impurities to subside, and pour off into vials while warm.

8. BRITISH OIL.

For the preparation of this patent medicine, there are in use two distinct classes of recipes, one having oil of Turpentine and the other Flaxseed oil or Spermaceti oil as the basis. The character of the medicine as exhibited in the directions, and the uses to which it is now applied, would seem to require a preparation selected from both classes. With this view the following formula is adopted; omitting the *oil of bricks*, a nauseous and unskilful preparation, which has long been banished from the pharmacopeias, although contained in most of the recipes, and introducing Seneca oil in its place. As there appears to be no good reason for retaining it, the Spermaceti oil is also rejected.


RECIPE.

Olei Terebinthinæ	f. $\frac{3}{5}$ viij	326.5
Olei Lini Usitatissimi	f. $\frac{3}{5}$ viij	326.5
Olei Succini	f. $\frac{3}{5}$ iv	163.25

Olei Juniperis	f. ζ iv	20.46
Petrolei Barbadensis	f. ζ iii	122.47
Petrolei Amer. (Seneca oil)	f. ζ j	40.82

Mix them well together.

1000 parts.

 In this report the weights, measures and preparations of the American Pharmacopeia are adopted as the standard.

In conclusion, the committee call the attention of the trustees to the character of the printed directions for these medicines. We are aware that long custom has so strongly associated the idea of the genuineness of the Patent Medicines, with particular shapes of the vials that contain them, and with certain printed labels, as to render an alteration in them an affair of difficulty. Many who use these preparations would not purchase British oil that was put up in a conical vial, nor Turlington's balsam in a cylindrical one. The stamp of the excise, the king's royal patent, the seal and coat of arms which are to prevent counterfeits, the solemn caution against quacks and impostors, and the certified lists of incredible cures, have not even now lost their influence. In stripping these medicines of their extravagant pretensions and false assertions, the committee are aware that they incur some risk of decreasing their sale. As they now stand however, they carry a falsehood in their very front and are a reproach to the profession. Owing to the very gross falsifications that have been vended under their name, the confidence of the public in them and their consequent sale, have no doubt lessened. If the trustees should therefore adopt the report which is now laid before them; have suitable papers of directions for the medicines prepared and printed; and make arrangements for furnishing them to such of the members as should adopt these recipes; the committee believe that the reputation of the college preparations would soon become widely spread, and that we should reap the benefit of the examination which has now been made, in an increased public confidence in the institution and its members; the influence of which would be felt in extending the drug business of our city.

The committee have made and lay before the board preparations of each of the formulæ recommended by them.

DANIEL B. SMITH,
SOLOMON TEMPLE,
SAMUEL JACKSON.

Philadelphia, 2d mo. 23d, 1824.

ART. VII.—*Pharmaceutical Notices.*—No. 7.

Syrups.—The syrups of Rhubarb, Rhubarb and Senna, Seneka and Orange peel, of the Pharmacopœia of the United States, would be improved by a previous maceration of these articles in diluted alcohol, and evaporation to one half, as is ordered in the common syrup of Sarsaparilla. Speaking from experience, syrups of infusions or decoctions, when made by maceration in diluted alcohol, are more active, are neater preparations, and generally not liable to ferment, as those compounded in the mode prescribed by the Pharmacopœia.

Tincture of ginger designed for the syrup of ginger, should be made from the Jamaica root, as the common ginger, whether dry or fresh, does not afford a tincture of sufficient strength, hence the constant complaints of the weakness of this preparation.

The old formula for the compound syrup of sarsaparilla recommends the use of the pale rose (*Rosa damascena*), and not the red rose (*Rosa Gallica*). The former is emollient and laxative, the latter tonic and astringent. Hence the employment of the pale rose is more appropriate to the character of the medicine, and was intended as an adjuvant to the senna; added to which, from the scarcity of the red rose in our market, it is sometimes impossible to procure it. The substitution of sugar for honey is clearly an advantage, as the latter readily ferments, and should therefore be discarded from all preparations of this nature.

Confections.—Syrups made from sugar are not good excipients for confections, as the preparation thus made will soon

dry, leaving the sugar in a crystalline state. Pure honey of a soft consistence is much to be preferred, it seldom ferments if not combined with water, and retains its original softness for years.

Precipitated Sulphuret of Antimony.—The best mode for preparing this article appears to be that recommended by M. M. Henry Jr. and Guibourt: this consists in using lime instead of potassa, and in precipitating the golden sulphuret of antimony by means of hydrochloric acid. The hydrochlorate of lime formed being very soluble, is much more easily separated from the precipitate by washing, than the sulphate of potassa which is formed where potassa is originally used.

Ointment of Rose Water.—If experiments be made, I think it will be found that a soft ointment will incorporate with, and retain the water better than a hard one. Our national Pharmacopœia, orders rose water, sixteen parts; oil of sweet almonds, sixteen parts; spermaceti, eight parts; white wax, one part. I have altered this as follows: rose water, twelve parts; oil of sweet almonds, sixteen parts; spermaceti, four parts; white wax, one part. The result has been very satisfactory, giving a smooth and soft ointment admirably calculated for the purposes for which it is used.

Conserve of Roses.—In no Pharmacopœias except the British and American is this confection directed to be made from the unblown flowers. Conserve of roses, although frequently used as a vehicle of other medicines, is still advised by some eminent physicians in this country as an astringent and is every where else exhibited as such. In this respect the expanded flowers should be used instead of the unblown ones, which have no astringent property. A handsome conserve of roses may be made from pulverized red roses, (expanded, gathered and dried carefully,) macerated first in a small quantity of rose water, and mixed with white sugar and soft honey of good quality, in equal proportions. The addition of a minute portion of cream of tartar or alum will impart a lively colour.—*E. Durand.*

Adhesive Plaster.—I have found the following mode of making this article to produce a good article: Lead plaster, eleven pounds; yellow resin, and yellow wax, each one pound; Burgundy pitch, three pounds.

These are to be melted in a brass kettle with the addition of sufficient water to keep them from burning, strained through a fine wire sieve into cold water, and formed into rolls; meanwhile malaxating the plaster for a considerable time until it has assumed a fine white texture similar to white shoe-makers' wax.—*T. M'Clintock.*

Syrupus Rhei cum Senna.—The following preparation, in which the same proportion of ingredients is employed as that given in the United States Pharmacopœia, is not liable to ferment in warm weather.

R. Rhei contusi.

Sennæ, *a a.* ℥vj.

Cardamomi contusi, ℥iss.

Alcoholis diluti, Ovj.

Digest in a closely covered vessel, shaking it frequently, for fourteen days; decant the supernatant liquor into a filter; press the dregs and strain the fluid obtained from them; mix the two liquids and evaporate to Oij. Twelve ounces of this intimately mixed with the syrup obtained from two pounds of sugar previously evaporated to Oiss. and still hot, will produce a syrup of about 30° Baumé.

Syrupus Rhei.—The same formula in principle is applicable to the simple syrup of rhubarb,

R. Rhei contusi. lb. ss.

Alcoholis diluti Oiv.

Treat as above, but evaporate the tincture to Oij. and mix intimately ℥viij of the evaporated liquid, with Oj. ℥f. xij. of syrup obtained as above.—*D. Stewart, Baltimore.*

Test for Balsam Copaiba.—The following simple plan of testing the purity of Balsam Copaiba, and its capability of

solidifying with magnesia, is very effectual, and is, I believe, new. This is its perfect solubility in Spts. Etheris Nit. fort. I have always been successful in making good solidified co-paiba with balsam which would dissolve in this menstruum and have always failed where the reverse was the case.

Caustic ammonia (proposed by M. Gerber,) will dissolve impure balsam, which will not solidify even when aided by considerable heat; but produces a milky solution, or rather mixture with that which is dissolved by the spirits of nitre. The best balsam I have seen was imported from Angustura; it was of a much lighter colour than any I have since seen, and solidified sufficiently to form pills in one or two hours. I have now a small cask from Brazil, which is of a deeper colour and requires three or four hours to harden, but forms a good mass, and is an efficient medicine.

I obtained from a portion of it, heated with alcohol and caustic soda, according to the process recommended by Ader, (Journ. Phil. Col. Pharm. vol. I. 117,) thirty-eight per cent. of volatile oil, of a very light colour and perfectly transparent. It should be noticed that the Spts. Etheri Nit. used was obtained from Farr and Kunzi, for I have tried the same article from other sources and have totally failed with it. In all the experiments the same calcined magnesia was made use of.—James Cooke, Fredericksburg, Va.

Extractum Jalapæ.—There is a disadvantage in boiling down the water on the jalap from one gallon to two pints as directed in the U. S. Pharmacopœia, as besides the active part of the root, we also obtain a very large quantity of amylaceous matter, thereby unnecessarily increasing the bulk of the extract and rendering the liquid extremely difficult to strain. This may be obviated by simply infusing the root instead of boiling. After maceration in alcohol, water almost in a state of ebullition is to be poured on the root, and the whole allowed to digest for twenty-four hours. By this means the water takes up the active matter without the fecula, the liquor is easily strained, and a beautiful extract is obtained much superior in appearance to that obtained by boiling the root.

Extractum Podophylli should be made in the same manner.

Mistura Ferri Composita.—The use of the words “in pulverem tritæ” in the directions given in the U. S. Pharmacopœia, have the disadvantage of probably inducing the pharmacist to employ the powdered myrrh of his shop, which is always artificially divided, instead of rubbing down extemporaneously the best rich fresh myrrh. The powdered myrrh will never make a good milk. A disadvantage also arises from the direction to rub down the myrrh, carbonate of potassa and sugar at the same operation; whereas the myrrh will make a much neater mixture when rubbed down separately, and the other articles subsequently added. This mixture is often disagreeable to the patient from its strong peculiar and permanent taste. A much more palatable form, and which is at the same time rather stronger, is frequently ordered by Dr. H. Bond of this city:—

R. Myrrhæ 3iss.

Ol. gaultheriæ gtts. vj.

Ol. myristicæ gtts. ij.

Potassæ carbonat. ʒij.

Sacch. alb. ʒj.

Ferri sulphat. 3ss.

Aquæ destil. f. ʒvj.

Rub down the myrrh and the two oils very gradually with some of the water, used at first by drops till thoroughly mixed, then add the carbonate of potassa and sugar, lastly the sulphate of iron dissolved in the remainder of the water, and bottle the mixture immediately.

The prototartrate of iron, formed from tartaric acid and iron filings, would probably be found an advantageous substitute for many of the preparations of this metal. It has no tendency to become oxidized by long exposure.

Morphia.—The morphia obtained by the process of the U. S. Pharmacopœia is generally mixed with more or less narcotine, particularly that which crystallizes from the first boilings. Narcotine is not dissolved in moderately weak

acetic acid, so that in making the acetate of morphia, nothing more is necessary than to add the acetic acid so long as it appears to dissolve any thing, and then to filter previously to the evaporation, always taking care that the solution be slightly acid to ensure its having dissolved all the morphia. After the filtration, the narcotine remains behind in the form of small white crystals. To prove whether any morphia remains in them, separate a small portion and drop on them a little nitric acid. If any morphia be present, a brilliant red colour will immediately appear very distinguishable from the yellow afforded by the narcotine. In making the sulphate of morphia, the narcotine is dissolved by the sulphuric acid along with the morphia; but in this state, being incapable of crystallizing, it remains chiefly in the mother liquors. To free the sulphate of morphia entirely, it must be subjected to a second crystallization.

The crystals of narcotine may be readily distinguished from those of morphia by attending to the following characteristics. The narcotine is much more easily freed from the colouring matter; readily crumbles into dust between the fingers; is soluble in sulphuric ether; yields a yellow instead of a red colour when touched with nitric acid; and when thrown on a heated plate of iron it burns with a dense smoke and a peculiar pungent fishy odour, very different from that of morphia.

Emplastrum Assafœditæ.—It is impossible to make assafœdita plaster by the formula adopted by our national Pharmacopœia from that of the Edinburgh College. The gum will not melt so as to admit of straining, neither will it mix with the other ingredients in its crude state so as to form a plaster. I have made this preparation by dissolving the assafœdita in diluted alcohol by means of a water bath, (in the proportion of one quart of diluted alcohol to about a pound of assafœdita,) then straining the hot mixture and evaporating to the consistence of a melted plaster or of honey. The galbanum was separately melted and strained, leaving about one fourth of its weight of impurities. The lead plaster and wax were melted together; then the melted and strained galbanum

was stirred in; and lastly the purified assafoetida and the whole stirred until cool. The galbanum might be purified along with the assafoetida more economically than by melting and straining. The assafoetida may also be purified by maceration in water and subsequent evaporation; but the quantity of liquid is necessarily much greater, and consequently more time is required to evaporate it.—*W. Hodgson, Jr.*

ART. VII.—*On Labarraque's Liquid.* By C. C. C. COHEN.
(In reply to ART. XLIII, Vol. IV.)

My object in making the communication respecting Labarraque's liquid, "was a desire that error apparently sanctioned by authority, should not go forth uncontradicted to the world," and this reply is made on the same views.

It was unfortunate that Mr. Durand had never perused his first essay on the chlorides of oxides, since its publication some years ago, until the errors in it were pointed out in my communication; and permit me to say, that I think he should have admitted that the correction of the errors alluded to, was owing to that communication. As a mere dispute about names is not material to the interests of science, I should not have adverted to this subject, except to correct the mistakes made by Mr. Durand. Mr. Phillips is charged with the error attributed to Dr. Granville alone, as can be readily proved by a reference to Mr. Farraday's communication.

Without entering into a long discussion of this subject, I will show that the most concentrated solution of chloride of lime does not equal in strength Labarraque's liquid, prepared according to Farraday's directions.

Chloride of lime contains about twenty-four per cent. of chlorine on the average, and if this be dissolved in twelve parts of water, the solution cannot contain more than the thirteenth part by weight of twenty-four per cent. or 1.84, whilst Labarraque's liquid contains two-thirds of the chlorine disengaged by the decomposition of 767 grains of peroxide of man-

ganese. In a mixture composed as follows: 2800 grs. of carbonate of soda, in 8960 grs. of water, weighing 11760 grs., the quantity of chlorine being equal to 450 grs., we shall find that the mixture will weigh $11760 + 450 = 12210$, which will yield 3.58 per cent. by weight of chlorine; a quantity much greater than can be obtained in any other solution.

Now with respect to Payen's process yielding an identical product with Labarraque's, the following facts will show to be impossible. Payen withdraws from the solution by means of the chloride of lime, two thirds of the carbonic acid of all the carbonate of soda employed; Labarraque on the contrary, does not withdraw a single particle of carbonic acid from the solution; again, Payen has his chlorine combined with caustic soda, which in consequence of changes well known to chemists, becomes chloride of sodium and carbonate of soda, when kept for as short a period as a week. Labarraque has the chlorine combined with the carbonate of soda, on which it has so little tendency to react, that the whole carbonate of soda employed in the solution may be regained by its spontaneous evaporation.

If these facts are not sufficient to prove that the two preparations are not identical, I can adduce none that are, and must leave the subject to the judgment of the reader without further comment.

In M. Gaultier de Claubray's theory, according to the exposition given of it by Mr. Durand, chloride of lime is decomposed by the carbonic acid of a vitiated atmosphere, and it would seem that this was the only agent capable of decomposing it; for my own part I do not believe that carbonic acid will ever completely decompose chloride of lime, although I can readily admit its action in partially precipitating the lime and disengaging the chlorine. Ammonia, its elements and compounds, always exist in atmosphere vitiated by miasmata, or the fœtid emanations disengaged during the putrefactive fermentation of organic compounds, and consequently, to ammonia, its elements and compounds (all of which instantly and completely react upon chlorides of oxides) must be ascribed the complete decomposition of these substances.

Mr. Durand assumes as a fact that Payen's liquid, when evaporated to dryness, yields as an ultimate result a bi-carbonate of soda mixed with chloride of sodium. Now is this an absolute impossibility?

Notwithstanding Mr. Durand's recommendation of sulphate of indigo as a test for the quantity of chlorine contained in chloridic solutions, I doubt if he would be able to ascertain it within ten per cent., and as the liquids under consideration do not contain more than 1.75 to 3.58 per cent. of chlorine, this test is obviously inapplicable to them. The best method with which I am acquainted for ascertaining the quantity of chlorine in liquids, is that proposed by M. M. Henry and Plisson, that of dropping the chloridic solution into one of ammonia, and measuring the quantity of nitrogen evolved.

SELECTED ARTICLES.**ART. VIII.—*Preparation of Crystallized Acetic Acid and Acetic Ether.* By M. SEVILLE AUGER.**

ALMOST all the pure and anhydrous acetates will afford a crystallizable acid; the acetate of silver produces it very pure by a dry distillation, but the high price of this salt prevents our using it. Verdigris gives an uncrystallizable acid, rarely containing more than 55° of real acid; two parts of verdigris only affording one part of real acid. The acetate of soda treated by sulphuric acid, gives the purest acid and is the best material to obtain it from. The sulphuric acid is to be purified by boiling it for a short time, and the acetate is to be crystallized several times successively, and then perfectly dried, taking care however, that it does not melt; it is then to be pulverized and redried, passed through a fine sieve and introduced into a perfectly dry retort. The quantity operated on should not exceed eight pounds, which requires twenty-four pounds of concentrated sulphuric acid. In this case the retort should be of a capacity of twelve pints at least. By employing a less quantity of acid the acetate would be imperfectly decomposed, and both sulphuric acid and pyro-acetic spirit would be obtained.

The retort is to be placed over the fire, and connected with a tubulated receiver, having a long neck, and the joinings luted with strips of paper; the neck of the receiver is to turn downwards and pass through a board sufficiently high from the ground to permit bottles of one or two pints capacity to be placed underneath. It is not necessary to use cold water to cool the product.

The furnace ought to be somewhat larger than merely to

contain the retort, and so high as to reach above its neck; it is not necessary to use a dome; the neck of the retort should be kept from becoming too much heated by means of an iron plate; the bottom of the retort should be a few inches above the fire. The apparatus being adjusted, the acid is to be poured into the retort; reaction will instantly commence, much heat will be disengaged, and if the sulphuric acid contains any nitric, a great quantity of red vapour will be given off. About one eighth of the acetic acid distills off without the application of heat; when the operation slackens, heat is to be applied very gradually. When the whole mass is dissolved, the operation is finished; it lasts generally about four or five hours. Examination must be made from time to time to see that no sulphuric acid distills over, as it is with great difficulty that we can prevent a small quantity, not only of this acid, but also of sulphate of soda, from passing into the receiver. As soon as the operation is terminated, the acid sulphate must be removed from the retort, the neck of which must be well heated to prevent its breaking.

To rectify the acetic acid, a sufficient quantity of acetate of soda is to be added to saturate the sulphuric acid, and the mixture redistilled with the above-mentioned precautions. Towards the end of the operation there are many explosions. The first products are the weakest. When the specific gravity is less than 1.0766, or 11°.3 of a good areometer at 60° F., the acid which passes over is crystallizable at 39° to 40° F. When the specific gravity is at 1.0622 or 8°.6 of the areometer, the acid is at its maximum of strength. The rectified product generally amounts to two kilogrammes (five pounds,) of a medium density of 0.80°; not more than one and a half kilogrammes (three pounds) of pure acid can be obtained.

Acetic acid crystallizes in thin laminæ at 59° F.; the temperature may be lowered still more, however, without its solidifying, but then the slightest agitation induces crystallization. The crystals dried on blotting paper, melt at 71° with a disengagement of heat. It appears that the crystallized acid, if melted, will not again assume the crystalline form, until the temperature is reduced considerably more than at first. It

boils at 225 F., and is rapidly distilled even without boiling. When liquid, it will take fire and burn like alcohol. It has a great affinity for water, of a proportion of which it cannot be deprived, except by combining it with a base; the chloride of calcium is not able to deprive it of this fluid. Anhydrous sulphate of soda dissolved in warm and strong acetic acid, of at least 0.20, deprives it of its water, and crystallizes; whilst this sulphate in a crystallized form, when dissolved in hot acetic acid of 0.85, gives out its water, and precipitates in an anhydrous form.

Sulphate of soda may be used to bring vinegar or pyroligneous acids of 0.05°, or 0.06° to 0.20°; but they must be subsequently distilled to get rid of this salt. It should always be attempted to obtain this acid at a single distillation, for at each repetition of the process there is some decomposition which gives an empyreumatic odour to the product. If it is not wished to obtain the acid perfectly pure, it may be prepared in large quantities, and at a cheap rate, with purified pyroligneous acid at 0.40°, obtained by the decomposition of acetate of soda by sulphuric acid. A copper alembic furnished with a silver worm and condenser is to be used; this is to be charged with the acid deprived of all sulphate of soda by a previous distillation, and the first product is to be rejected as being too weak; the distillation is continued almost to dryness, this is to be repeated twice, the apparatus is then to be taken apart and cleansed, and then again charged with the whole or a part of the three distillations, the medium strength of which is about 0°.55 and of a specific gravity of 10°.656 or 10°.2; it is again to be distilled, giving products which are to be kept apart, of from 10°.766 or 11°.3, at 60° F. When it has reached this point it decreases whilst the strength of the acid increases; the recipients are now to be changed, and it will be found that the products are more crystallizable according as they are less dense.

The same apparatus may be used for obtaining acetic ether on a large scale and of great purity. For this purpose, 30 kilogrammes (76 lbs.) of pure acetate of soda, well dried and sifted, is to be introduced into the alembic with 43 litres (126 pints) of

alcohol, at 33°; these are to be well mixed, and 9 kilogrammes (22 lbs.) of concentrated colourless sulphuric acid added, and the whole carefully stirred; the cover is then to be placed on, and a curved tube adapted by which 18 kilogrammes (44 lbs.) more of the sulphuric acid can be added. Much heat is disengaged, and the ether is produced without the aid of heat, and at first runs off in a stream; when it begins to come over in drops, heat is to be applied, the distillation continued almost to dryness; 56 kilogrammes (138 lbs.) of impure ether of 19° Cartier will be obtained, which is to be redistilled with 20 lbs. of sulphuric acid, producing 47 kilogrammes (120 lbs.) of ether at 24° Cartier, to which is to be added about one kilogramme (2½ lbs.) of slacked lime; after some time the fluid is to be decanted and redistilled, separating the first portions which come over, these are yellow and turbid, having a density of 23° Cartier, the density augments to 27°, and the distillation is to be continued until the liquid passes over acid and of a brown colour. By this means 4 kilogrammes (10 lbs.) of ether at 26° Cartier or 0.900 are obtained, which contains but a small portion of water and alcohol. If it is wished to obtain it very pure, it must again be distilled with one or two kilogrammes (3 or 4 lbs.) of concentrated acetic acid, washed, passed over a little lime and potassa, and, finally, rectified over chloride of calcium.—*Journ. de Chim. Med.*

ART. IX.—*On the transformation of Hydrocyanic Acid and the Cyanides into Ammonia and Formic Acid.* By M. J. PELOUZE.

STRUCK with the identity of composition which calculation indicates between the formiate of ammonia, and a supposed solution of hydrocyanic acid in three atoms of water, and of the formation of hydrochlorate and of sulphate of ammonia, observed by M. Kuhlman, on adding hydrochloric and sulphuric acids to the hydrocyanic, I was desirous of observing how far this remarkable analogy extended, and therefore undertook the following experiments.

Anhydrous hydrocyanic acid prepared according to the process of Gay-Lussac, was added to about its own volume of fuming hydrochloric acid. In about four or five minutes the mixture assumed a crystalline appearance, producing a very sensible disengagement of heat. This mass subjected to distillation, volatilized without residue; and successively afforded hydrocyanic, hydrochloric and formic acids, and finally hydrochlorate of ammonia. I recognized the formic acid, from the liquid product of the distillation, when heated with the red oxide of mercury, producing a violent effervescence, owing to a disengagement of carbonic acid. The mercury instead of being reduced to the metallic state, as takes place with pure formic acid, was found in the state of a protochloride.

Sulphuric acid gave rise to a reaction similar to that produced by the hydrochloric acid, except that it operated with more difficulty and less quickness. The formic acid can be obtained by distillation, and it may readily be separated from such parts of the hydrocyanic acid as have not been acted upon. This operation, however, requires some precautions, in order to succeed perfectly; as the sulphuric acid easily converts the formic acid into water, and gaseous oxide of carbon. It must therefore be diluted with water, and not used in excess. Having observed these phenomena, it was not difficult for me to account, on the one hand, for the great differences in the quantities of hydrocyanic acid obtained from the same weight of cyanide of mercury; and on the other, for the great solubility and other peculiar properties of the residuum in the preparation of this acid.

One proportion of cyanide of mercury treated by one proportion of slightly fuming hydrochloric acid, the strength of which had been ascertained by saturation, afforded me one proportion of hydrocyanic acid and one of perchloride of mercury, but no formic acid or ammoniacal salt; but when I employed an excess of hydrochloric acid, this excess meeting with hydrocyanic acid and water, gave rise to formic acid and hydrochlorate of ammonia, which entering into combination with the bi-chloride of mercury, produced that double

salt formerly known under the name of *Sal alembroth*; in this case but a small quantity of hydrocyanic acid was obtained. This double salt of mercury and ammonia had all its peculiar characters, and besides, it sufficed to treat the residue of the operation with lime, to demonstrate the presence of ammonia by its pungent smell. Where equal proportions of hydrochloric acid and cyanide of mercury are employed, the residue does not contain the ammoniacal salt, and is only composed of chloride of mercury.

With the cyanide of potassium, the same action,—the production of chloride of potassium and of hydrochlorate of ammonia, if an excess of hydrochloric acid has been employed. In the contrary case, there is no ammoniacal salt formed. These experiments demonstrate care must be taken in the preparation of hydrocyanic acid by the method of Gay-Lussac, not to employ an excess of hydrochloric acid, as the low price of this latter and the high one of the cyanide of mercury might induce us to do.

I endeavoured to discover whether the possible presence of formic acid has any thing to do with the sometimes so rapid and sometimes so slow spontaneous decomposition of hydrocyanic acid; the transformation of the hydrocyanic acid into ammonia and formic acid under the influence of water and the acids, led me to look for analogous cases, and I found a remarkable one in the treatment of the cyanide of potassium by the action of heat aided by that of water. A concentrated solution of the cyanide of potassium subjected to ebullition without contact with the air, was decomposed; one proportion of this cyanide acting on four proportions of water, gave rise to one proportion of ammonia, which was disengaged, and one proportion of formiate of potassa. This transformation, produced by the mere ebullition of the solution, went on at first with rapidity, gradually slackened, and was completed only after the water, which had evaporated, had been several times renewed. If instead of heating the moistened cyanide of potassium, it be calcined dry, and not exposed to the air, it is not decomposed at any temperature; but the addition of an excess of caustic potassa, produces, as in the former expe-

riment, ammonia and formiate of potassa, which when the fire is increased, is decomposed just below a dull red heat; assuming therefore, at one proportion, the water of the potassa, one proportion of oxygen to form two proportions of carbonate of potassa, whilst two proportions of hydrogen are disengaged.

In subjecting a solution of cyanide of mercury to the action of heat, there is a production of formic acid, as in the preceding case, but the greatest part of this acid is decomposed by the oxide of mercury, whence results, besides the formation of ammonia and hydrocyanic acid, a disengagement of carbonic acid, and the reduction of the oxide.

Curious to know what action was exercised on the animal economy, by a body which has exactly the same composition as a supposed solution of hydrocyanic acid in three proportions of water, I sent a certain quantity of the formiate of ammonia to M. Kunckel, Jr. He administered it in large doses to animals without any effect. I myself dissolved a gramme in a half glass of water, which I drank without any disagreeable result. The impossibility of obtaining Prussian white with this salt, led me to foresee its want of medical properties.

The formiate of ammonia is very soluble in water, of a white colour, and a fresh and pungent taste. When subjected to the action of heat, it completely fuses at 120° C.; at 140° C. it gives out a small quantity of ammonia, and at 180° C. it is transformed into hydrocyanic acid and water. Only a few traces of the formiate escapes decomposition, when the operation is performed in a narrow tube plunged into a column of mercury, kept at a temperature of 180° C. The product of the distillation is an excessively concentrated hydrocyanic acid, for it contains less than its weight of water. This decomposition cannot be better compared than to that of the nitrate of ammonia into water and protoxide of azote, and is effected with the same facility.

The result of these experiments being verified, are we to regard hydrocyanic acid dissolved in water, as formiate of ammonia? If on the one hand, the action of acids on the

hydrocyanic acid, which gives rise to ammoniacal salts and formic acid, militates in favour of this hypothesis, on the other hand, the medical inertness of the formiate of ammonia, its not affording Prussian white, without being subjected to the action of heat, authorize another view of the subject, and would rather lead us to assimilate the aqueous solution of hydrocyanic acid to that of other acids. At the same time, if it be true, as has been asserted, that Prussic acid diluted with water, does not always act as a poison, we may be permitted to suppose that this diluted acid is sometimes susceptible of passing into the state of a formiate of ammonia.

A knowledge of some of the facts in this paper, is important to the manufacturer of Prussian blue and of ferrocyanate of potassa; it will teach him that he must be careful to avoid boiling the residue of the animal matters treated with potash, in water, or of throwing this residue whilst it is yet hot into water, and finally to calcine these animal substances with an excess of the alkali. In each of these cases, it would be decomposed and produce formic acid or ammonia or else this alkali, hydrogen and carbonate of potash. It should be heated with cold water and the sulphate of iron added to the solution before heat is applied. When the cyanide of potassium has once combined with the iron, it acquires sufficient stability to evaporate without alteration. To recapitulate:—

1. Hydrocyanic acid is transformed into ammonia and formic acid by the action of hydrochloric and sulphuric acids, and doubtless also by many others.

2. A concentrated solution of the cyanide of potassium, subjected to the action of heat, is changed into ammonia and formiate of potassa.

3. The same salt at a high temperature and united with an excess of potassa, yields hydrogen, ammonia and a residue of carbonate of potassa.

4. One proportion of cyanide of mercury in acting on one proportion of hydrochloric acid, yields one proportion of hydrocyanic acid and one proportion of perchloride of mercury.

5. An excess of hydrochloric acid produces with this salt,

a double chloride of ammonia and mercury, formic acid and a little hydrocyanic acid.

6. Formiate of ammonia subjected to the action of heat at 180° C. is transformed into water and hydrocyanic acid.

Journal de Pharmacie, April 1832.

ART. X.—*Experiments upon the Solidification of raw Gypsum.* By JOHN P. EMMET, Professor of Chemistry in the University of Virginia.

THE facility with which burnt gypsum sets, when made into a paste with water, has rendered it not only conspicuous among minerals but highly useful in the arts; hitherto, however, as far as I am aware, it has not been supposed that the raw or natural production is capable of exhibiting the same property. The following experiments, although resulting from an enquiry not professedly connected with the subject of the present communication, and therefore not, perhaps, carried as far as they might have been with advantage, are considered of sufficient importance to receive a distinct notice. They satisfactorily show that native gypsum may be rendered capable of perfect solidification without having undergone the operation of burning, and may perhaps contribute to illustrate or render more available the setting property of this valuable natural production.

Raw gypsum, finely pulverized, is capable of undergoing immediate and perfect solidification, when mixed with certain solutions of the alkali potassa. Among those that answer best, may be enumerated caustic potassa, carbonate and bicarbonate, sulphate and super-sulphate, silicate and double tartrate or Rochelle salt.

In all these cases, the process may be easily rendered more expeditious than when burnt plaster alone is employed, and the resulting solid, after having been properly dried, does not seem to differ essentially from that usually obtained, except in composition. There does not appear to be any exact point of saturation; for the solid masses, when broken up and

worked with fresh portions of the solutions, constantly recover their tendency to set, even when the saline matter is in very great excess; yet, no doubt, each case requires a specific amount, in order to produce the maximum of solidity. When water alone is employed, after the first mixture, the paste rarely exhibits any remarkable tendency to become hard; but a fresh application of one of the foregoing solutions never failed to develop it promptly.

There is also a marked difference as to the time required for the operation; solutions of carbonate and sulphate of potassa, if sufficiently dilute, produce their effects so slowly as to admit of complete incorporation, whereas Rochelle salt acts as soon as the powder touches the fluid and all subsequent motion necessarily weakens the cohesion. If crystals of Rochelle salt be triturated with raw gypsum and water, and then brought in contact with the mixture, there will be no apparent interval of time between contact and solidification. This extreme rapidity effectually prevents incorporation by the ordinary mode, and would induce one to imagine that Rochelle salt does not possess the power; for when the gypsum and solution are worked together with a spatula, although the particles feel hard and harsh, they readily crumble, and by continuing the operation, actually assume a semi-fluid condition.

No other salts, but those holding potassa, were found to render raw gypsum capable of solidification. Those of soda, as far as they were examined, invariably produced a contrary effect, if we except Rochelle salt, which, however, seems to operate by its potassa. Yet it is remarkable that several neutral salts of the latter alkali, as the nitrate and chlorate, did not occasion the slightest alteration. The bicarbonate of potassa invariably produced a brisk effervescence, which considerably impaired, although it did not prevent, solidification. The same disadvantage characterizes the action of supersulphate of potassa, whenever the mineral contains an admixture of carbonate of lime, as was found to be the case with the specimen of gypsum under examination. As the idea has been advanced that the setting property of

ordinary burnt plaster, depends upon the presence of carbonate of lime, most of these experiments were repeated, with equal success, upon pure sulphate of lime obtained by precipitation.

The opinion that carbonate of lime facilitates or causes solidification in the ordinary case, seems but little entitled to belief, when it is considered that the heat, necessary for the burning of plaster, falls far short of that required for bringing limestone to its caustic state, or even to that half calcined condition which renders it capable of hardening under water; but, whatever may be its agency, subsequent to the application of heat, the operation must be totally different in the present case, since the supersulphate of potassa completely decomposes all the carbonate of lime in the gypsum.

It is probable, as Gay-Lussac has observed, in his examination of this singular property of burnt plaster,* that we should refer the fact to an inherent property of the mineral; yet I cannot but think the foregoing experiment abundantly proves that it does not always depend upon the simple union with water, and subsequent aggregation of the saturated particles, as seems to be the fact with burnt plaster. These cases may not, indeed, be parallel, as some of the saline solutions added, *partially* affect the composition of the gypsum; yet I have satisfied myself that the alteration is neither uniform nor essential to the result, although it is extremely difficult to ascribe the solidification, in the foregoing instances, to the proper cause. Both potassa and its carbonate are extremely deliquescent, and do not, therefore, act by rapidity of crystallization; sulphate of potassa cannot affect the composition of sulphate of lime, and although the former salt may possibly be formed in all the cases of mixture enumerated, it does not seem to form any permanent combination with the gypsum, since the latter, in two experiments, was found to lose one twelfth of its weight by the mixture of the substances and subsequent washing with warm water. The only uniformity observable, in all the saline solutions capable of producing soli-

* *Annales de Chimie et de Physique*, tom. xl. p. 436.

dification, is the necessity of the presence of potassa, and the rapidity with which the operation takes place seems greatly opposed to the supposition that the result depends upon double decomposition. If we take the pulverized gypsum and saturate it by the solution of carbonate of potassa, all subsequent chemical action, from the same substances, should be prevented, and yet, when the solidified mass, thus formed, is worked up again with a fresh portion of the same saline solution, it sets with equal facility. This property appears but little diminished by three or four repetitions. As plain water does not answer, until after the evaporation of the fluid, it seems more probable that the saline solutions exert a kind of repulsion towards the particles of gypsum, and thus tend to promote that solidification which is so very characteristic of it in the burnt state.

The experiment which first exhibited the solidifying property of raw gypsum, was well calculated to give the impression that chemical decomposition was necessary for the result. I wished to determine how far fresh precipitated carbonate of lime was capable of improving gypsum, (intending subsequently to burn the mixture;) with this view, pulverized, raw gypsum was placed on a filter, and a cold solution of carbonate of potassa poured over it. The result was the rapid solidification of the crude mineral and an evident diminution of the alkali. Upon repeatedly returning the same solution through the filter, tumeric paper ceased to indicate the presence of potassa, and reagents showed that sulphate of potassa had taken its place. In this manner, a saturated solution of the latter salt may soon be obtained. Yet, as has been already stated, a further examination proved that the sulphate of potassa is not capable of contracting a permanent union with the gypsum.

Further enquiry will, no doubt, lead to the detection of salts better adapted to the developement of this property than those here noticed, but the cheapness of carbonate of potassa seems more likely to recommend its use for practical purposes, provided it shall be found that the solidification of raw or effete plaster, by the process here indicated, equals, in

durability, that which has been recently burnt. Gypsum, it is well known, requires judicious treatment, in order to fit it for taking casts, and unless carefully defended from moisture, will soon lose its valuable property. The process of burning may, moreover, not always be convenient, and in this case, a solution of carbonate of potassa, or, for common purposes, the ley from wood ashes, will always enable the operator to effect rapid solidification, and, as far as I have observed, it is perfect.

ART. X.—*On the Chemical History of Meconine.*

By M. CONERBE.

[EXTRACT.]

THE author announced that he had discovered this substance in 1830, without, however, being able to ascertain its properties, from the small quantity obtained. Before he began another series of experiments, he learnt that M. Dublanc, Jr. had previously found an azoted substance, burning without flame, giving rise to ammoniacal products, and containing much more hydrogen than is found in narcotine. M. Conerbe is of opinion that the crystalline substance he denominates meconine, is identical with that which has been obtained, but incompletely studied by M. Dublanc.

Pure meconine is solid, white, inodorous, at first almost tasteless, and afterwards sensibly acid; it is soluble in water, alcohol and ether, and crystallizes from these three menstrua. The crystals are six sided, terminated by a dihedral pyramid; it melts at 194° F. and is then colourless and very limpid; it preserves its liquidity till the thermometer has descended to 163° F.; at 343° F. it volatilizes and distils over without alteration, and on cooling assumes the form of a white mass resembling fat.

Meconine dissolves in 265.75 parts of cold water and 18.55 of boiling water. Alcohol, ether, and the essential oils dissolve much more than water; potassa and soda also dissolve meconine without altering it. Sulphuric acid, diluted with a quar-

ter or half its weight of water, dissolves this substance without the assistance of heat. This solution is limpid and colourless; exposed to a gentle heat, greenish striæ are formed, which increase as the concentration is greater; finally all the fluid assumes the beautiful deep green of chlorophylline. The meconine, in this state is completely decomposed and cannot be reproduced.

If alcohol be poured on this green sulphate of meconine, a mixture takes place and the fluid assumes a bright rose colour; but if the alcohol be driven off by heat, the green reappears. If instead of alcohol, water be added, there is a precipitate of a brown flocculent substance, which is not redissolved even with the assistance of heat. These flakes are to be separated by the filter; the fluid then appears of a decided, but not deep rose colour; concentration by a gentle heat restores the green colour. This double change can be reproduced at will, until the organic matter in the solution is exhausted.

The brown matter separated by the filter, is soluble in concentrated sulphuric acid, which it colours green; also in the alkalies, alcohol and ether. Its solution in the two latter is of a beautiful deep rose colour. The salts of lead, alumina, or tin, when added to the alcoholic solution diluted with water, precipitates it in the form of a lake. It is obvious that it is this brown matter that colours the solution green, in one case and rose coloured in the other, according to the presence or absence of water.

Concentrated nitric acid dissolves meconine at common temperatures. The solution which is of a beautiful yellow colour, affords on the addition of water, a precipitate which has not been studied. If the nitric solution be subjected to a gentle heat, the acid is disengaged without any apparent sign of nitrous gas, but yellowish crystals are formed at the edge of the capsule which are unalterable even on evaporation to dryness. When the whole of the acid has been driven off, the remaining mass melts and on cooling again forms yellowish crystals.

On passing a current of pure and dry chlorine over meconine heated to fusion, a red colour is produced, which deepens

as the gas is absorbed, till at last the mass becomes blood red. In this state it requires a temperature far higher than that at which meconine melts, to remain in a liquid state; on cooling it loses its beautiful red colour, and crystallizes in needles. The author states that it is a chloride of an organic base, composed of

Chlorine 25.75

Organic matter 74.25.

We say a chloride of an organic base, for its radical, as will hereafter be seen, is not meconine, as it would have been natural to suppose. After having developed the principal properties of meconine, the author speaks of its composition. This substance not being azoted, as has been already shown, its analysis was easy. Four experiments, each made on a decigramme of meconine, gave the following proportions:—

Carbon 60.247

Hydrogen 4.756

Oxygen 34.997.

These numbers correspond to nine atoms of carbon, nine of hydrogen and four of oxygen; which fixes its atomic weight at 1142.102. The analysis calculated on this formula gives nearly the same sums as those obtained by actual experiment; or,

Carbon 60.234

Hydrogen 4.742

Oxygen 36.023.

M. Conerbe then returns to the crystals obtained by the evaporation of a nitric solution of meconine. These crystals contained a little nitric acid, which could not be wholly driven off by heat, without altering the organic matter; but which may be got rid of, by dissolving this product in boiling distilled water; collecting the crystals which are deposited on cooling, dissolving them in boiling alcohol and crystallizing. The substance, which after this purification contains no free acid, is in the form of long and slender four sided prisms, with a square base. Exposed to a temperature of 334° F. they melt, and at 422° F. are for the most part volatilized; the remaining portion dries, and on an increase of

temperature is decomposed, giving out a smell of bitter almonds. When thrown on live coals, it burns, diffusing an odour of hawthorn.

Ether also dissolves this substance; the solution is colourless, which is not the case with alcoholic and aqueous solutions. The concentrated acids do not destroy this substance, but dissolve it with the aid of a gentle heat, affording crystals on cooling. If the acid solution be diluted with water, it appears colourless, like that made with ether, and the crystals resulting are of a brilliant white colour.

Potassa, soda and ammonia, dissolve this substance with great facility; the addition of an acid, precipitates it in its original form. From the above, it appears that this substance is endowed with many properties which ally it to the acids; like them also, it acts, though feebly, on the vegetable colours. M. Conerbe has attempted to investigate the composition of this substance; but having operated on a very small quantity, he obtained results of so uncertain a character, that we shall not detail them. He afterwards examined the crystalline product obtained by the reaction of chlorine on meconine. This was almost insoluble in boiling water, and scarcely acted on by sulphuric ether; alcohol at 36° and boiling, dissolved it with difficulty; nevertheless, when the solution was effected, crystallization did not take place on cooling, requiring evaporation for this purpose. When left to itself, this solution afforded granular crystals, of no determinate form, contaminated by a yellow matter, which may be removed by cold alcohol at 38° and offers all the physical characters of a soft resin. The crystals cleansed from this resin are white, of an acrid and acid taste, soluble in ether and alcohol, very little so in water, melting at 289° F. and volatilizable at 406° F. Placed on burning coals, they burn without flame, affording a smoke of a white colour, having an odour like that of Jasmine. They contain,

Chlorine 5.43

Organic matter 94.57.

When heated in a small tube, this compound melts and assumes a yellowish colour, when the temperature reaches 289°

F. it rises along the tube and may be distilled in the form of a crystallizable yellow liquid. In this operation, a small portion of the matter is burnt, giving rise to acid products and leaving traces of charcoal at the bottom of the tube. When dissolved in weak alcohol and treated by the oxide of silver, it parts with its chlorine. The excess of oxide of silver and the chloride may be separated from the fluid by the filter, and if this fluid be now subjected to crystallization, a white, pearly matter is obtained in the form of powder, which is soluble in ether, and on crystallizing from this menstruum assumes the form of very short four sided prisms.

This pearly matter, which is the radical of the chloride, begins to melt at 352° F. and volatilizes at 361° F.; it reddens litmus paper, and precipitates the salts of lead and copper, but has no effect on those of silver, iron, lime, or mercury. Sulphuric or hydrochloric acid do not affect it, nitric acid destroys it, but does not appear to convert it into oxalic acid. Alcohol and ether, as has already been said, dissolve this substance, and deposit it on cooling; boiling water also dissolves it, and permits it to crystallize on cooling, in the form of very white and delicate four sided prisms.

From the resistance of this substance to the action of strong acids, M. Conerbe at first thought it might be Benzoic acid, but comparative experiments made with great care, convinced him that it was a new immediate principle, which he has denominated mechoic acid.

Extraction of Meconine.—This substance is far from being abundant in opium; that from which the most is obtained is neither the best nor the dearest; in fact Smyrna opium is best for the purpose. This is to be finely divided and treated with cold water till this fluid is no longer coloured; it is then to be filtered and evaporated to 8° Baumé, and ammonia diluted with six times its weight of water added as long as any precipitate ensues.

The compound precipitate thus obtained, is separated by decantation after standing for two or three days. It is to be washed as long as the washings are coloured; these washings are to be added to the ammoniacal menstruum in which the

precipitate took place, and the whole subjected to a gentle heat, till it has acquired the consistence of clear molasses. It is then to be placed in a cool situation; in two or three weeks there will be found a granulated mass, the surface of which is often covered with a coating of beautiful crystals. These crystals are to be separated from the mother water by decantation, and dried by pressure aided by heat. To extract the meconine from them, and to separate the meconates, and other substances, with which they are mixed, they are to be several times treated with boiling alcohol, at 36° . When this fluid appears to have no action on the mass, the alcoholic washings are to be united together, and evaporated till only one third is left, when crystals will form on cooling.

The crystals thus obtained are not pure; they still contain meconates and colouring matter. To get rid of the latter, they must be dissolved in boiling water, and treated with animal charcoal. The crystals obtained on evaporation, besides the meconates spoken of above, contain a greater or less quantity of narceine. To separate these different substances, the compound should be treated with boiling ether, which dissolves only the meconine, and deposits it on cooling and evaporation. It is useless to wait for the total disappearance of the ether to collect the crystals, for there is this remarkable circumstance as regards meconine, that no matter in what solvent it begins to crystallize, almost the whole of it precipitates, so that very little remains in the liquid.

The whole of the meconine is not always to be found in the ammoniacal liquids from which the morphine has been obtained; it is often precipitated with this substance, and remains united with it, if the washings are not conducted with great care. When it is suspected that these bodies are united, M. Couerbe indicates how they may be separated, without interrupting the process to obtain the morphine. He has always operated on large quantities of opium; he thinks that if his experiments be repeated on small quantities, as a few ounces for instance, the meconine may escape notice, as it only enters a two thousandth part into the composition of opium.—*Jour. de Chi. Med.*

ART. XI.—On the Coca. By ALEXANDER COCHET.

Coca is the leaves of a shrub indigenous to Peru, and growing to the height of two to four feet. The flowers of this shrub have some resemblance to those of the *griotte*, (a species of cherry,) but are rather smaller. Its fruit is a drupe about the size of a grain of pepper, but oblong, composed of a red pulp, surrounding a one seeded nut.

This shrub is cultivated in several parts of Peru. The leaves are gathered three times a year, first in the month of April. They are dried in the sun, and then packed in small bales. The shrub is in bearing for fifteen or twenty years.

There is a great consumption of coca, the annual value being from four to five millions of dollars. The Indians are so habituated to its use that they can bear any privation except of it, and the medical men of the country declare that without coca the Indians are not capable of supporting the fatigues of mining, or even of resisting the rarified air of some parts of the country. They chew it whilst on a journey, swallowing the juice, the extraction of which, as well the secretion of saliva, they aid by also holding in their mouth a fragment of a kind of crude but weak potash, which they obtain by making a paste of ashes and drying it in the air. This alkaline substance is known in Peru by the name of *ypta*, and forms an object of merchandize.

When provided with coca, they can make rapid journeys without suffering in their respiration, and can take unremitted exercise without being worn out by fatigue. They have been known, when acting as guides, to travel twelve or fourteen leagues without stopping, and to perform this as rapidly as the best mounted horseman. This arises from the circumstance, that in these elevated regions the horses soon suffer in their wind, and hence gradually relax their speed; whilst, on the contrary, the Indians, by constantly using the cocoa, do not thus suffer, and always keep the interior of their mouth in a moist state.

The inhabitants of the country support all kinds of fatigue for two or three days, without any other stimulant than the coca.

Some persons take it in the form of tea, and consider it as very favourable to the health. The author himself experienced good effects from it in attacks of cholic, which are of very common occurrence in Peru.

When chewed in large quantities, the coca causes a kind of intoxication and loss of sleep. The taste of the leaves is of a faint aromatic bitter.

Journal de Chim. Med.

ART. XII.—Specific Gravity of Volatile Oils. By

M. GUIBOURT.

In the July number of our Journal (page 145 et seq.) we gave a paper of M. Guibourt's on the specific gravity of the volatile oils; since then this learned experimenter has given several important corrections of errors to be found in his original article. The principal of these are, that M. Chardin used by mistake in some of his experiments a centigrade thermometer instead of Reaumur's. Thus the specific gravity of the oil of bitter almonds having been determined at a temperature of 20°, M. Guibourt gave it as 25°, supposing that Reaumur's thermometer had been used. The first number must therefore be substituted;—hence all the temperatures marked Ch. 25° should be 20°; Ch. 18°.75 should be 15°; and Ch. 12°.50 should be 10°. The temperatures Ch. 18° must not be changed.

M. Guibourt goes on to say that some other errors should also be corrected; thus, for bergamot, Ch. 25° specific gravity 0.8675, read 0.8775; camphor, Briss. 11°.50, read 12°.50; turpentine, Briss. 31°.66, read 12°.56.

M. Guibourt also adds the following table of the specific gravity of volatile oils as determined by M. Th. Martius of Erlangen, as well as the reaction caused by these oils on the tincture of litmus. Those marked M. were prepared by M. Martius himself:—

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BLUR COF

that in these elevated regions the horses soon suffer in their wind, and hence gradually relax their speed; whilst, on the contrary, the Indians, by constantly using the cocoa, do not thus suffer, and always keep the interior of their mouth in a moist state.

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RED

PY

turpentine, Briss 51°.66, read 12°.56.

M. Guibourt also adds the following table of the specific gravity of volatile oils as determined by M. Th. Martius of Erlangen, as well as the reaction caused by these oils on the tincture of litmus. Those marked M. were prepared by M. Martius himself:—

SPECIFIC GRAVITY OF VOLATILE OILS.

NATURE OF THE VOLATILE OIL.	SPECIFIC GRAVITY.	EFFECT ON LITMUS.	OBSERVATIONS.
Aniseed M.	0.9853	scarcely reddened.	Recent.
" East Indian C.	0.987	not reddened.	"
Amber, red	0.9641	slightly reddened.	"
" rectified M.	0.8578	strongly reddened.	"
Balm	0.8546	not reddened.	Prepared for a year.
Bergamot	0.8737	do. do.	Recent.
"	0.8801	very slightly red'd.	"
Cajeput	0.9246	reddened.	"
" rectified M.	0.916	not reddened.	"
Chamomile (genuine) M	0.924	"	"
" spurious M.	0.870	"	" [years.
Cassia	1.0608	reddened.	Prepared for two
Cinnamon	1.0906	strongly reddened.	"
Caraway M.	0.9619	" "	"
Cedrat (Lemon)	0.869	feebly reddened.	"
Cedar	0.8609	" "	"
"	0.869	" "	"
Fennel M.	0.9853	not reddened.	"
Juniper M (from berries)	0.9120	strongly reddened.	"
Cloves M.	1.0555	scarcely reddened.	"
" from the peduncles	1.009	not reddened.	"
Oil from bituminous } coal rectified M. }	0.795	"	"
Lavender	0.886	feebly reddened.	" [year.
" rectified	0.8875	reddened.	Prepared for one
" "	0.872	"	Recent.
Lemon (<i>Citrus limetta</i>)	0.931	strongly reddened.	" [rated.
Mace	0.8715	not reddened.	Apparently adulte-
"	0.947	strongly reddened.	"
Orange M.	0.845	not reddened.	Prepared one year.
Peppermint	0.9013	"	"
" rectified M.	0.9098	"	"
" not rectified M.	0.9024	"	"
Petroleum	0.851	"	"
" rectified M.	0.814	"	"
Savin	0.931	"	"
Sassafras	1.0842	reddened.	Old, with deposit.
"	1.0809	"	"
Semen contra	0.912	"	"
Tansy	0.889	not reddened.	"
Turpentine not rectified	0.8832	strongly reddened.	"
" rectified M.	0.9056	feebly reddened.	"
Valerian M.	0.9438	strongly reddened.	"
Wormwood M.	0.8947	not reddened.	"
" of commerce	0.877	"	"

ART. XIII.—On Parffin and Eupion.

DR. REICHENBACH has discovered two substances by the dry distillation of organic bodies, to which he has given the above names. The first from *parum affinis*, on account of its remarkable indifference or want of affinity; and the second from *πᾶν* or *πῶν* fat, and *εὔ*. These substances appear to be both contained in the tar of animal and vegetable substances. Beech wood tar yields the most paraffin, and with the greatest facility; while the oil of Dippel gives most eupion.

If the tar obtained by the carbonization of beech wood be subjected to distillation, the receiver, provided it has not been changed nor removed, contains three different liquids: at the top, light oil of tar, in the middle a watery acid liquor, and at the bottom heavy oil of tar. This last is to be subjected to repeated distillations; and when the product becomes rather thicker, and contains small shining particles, the receiver is to be changed, and the heat is to be increased as much as the glass will allow of, and until the residue becomes black and thick. The receiver then contains a yellow thick vapour, and an oily liquor, in which brilliant particles of paraffin are observable by transmitted light. If the liquor has not acquired the proper state, it is to be obtained by repeated distillations, and the paraffin may be separated in two different modes.

The first consists in mixing and shaking the distilled liquor with alcohol of specific gravity 0.837. After standing a little time, there deposits from the turbid mixture, a viscid liquid mass, which is to be repeatedly washed with alcohol of the same strength, until it is converted into small colourless plates. These are then to be dissolved in hot absolute alcohol, and as the solution cools, paraffin separates in small white needles, and in small plates: in order to purify them perfectly, they may be redissolved in hot absolute alcohol, from which they separate on cooling.

The following is a better method: Distil the heavy oil of tar repeatedly, and mix it gradually with one tenth of its weight of concentrated sulphuric acid, adding this quantity re-

peatedly until the mixture has become entirely black and fluid; this action is attended with heat and the evolution of sulphurous acid. The oil requires from a quarter to a half its weight of acid. If the heat does not rise to 212° F. it must be raised to that degree artificially. The mixture is then to remain at least twelve hours exposed to a heat of not less than 124° F., in order that the paraffin may not congeal; it then is found as a colourless liquid on the surface. Decant this liquid, which is a compound of paraffin and a peculiar oil; or when all is cold, let it be taken off in a cake, break it, wash it with water, and press it in bibulous paper. By this method the oil is absorbed by the paper, and the paraffin remains in small scales, which are to be purified by solution in hot absolute alcohol: it may afterwards be melted into one mass, under hot water, and should then be colourless and transparent as glass, dry and slightly fusible, and make no greasy spot on bibulous paper.

Sometimes it happens that the combination of paraffin and oil does not separate properly from the sulphuric acid; in that case it is to be distilled; water, sulphuric acid, and an oil evaporates: as soon as the last thickens, it then contains paraffin, which is to be separated and treated as before, with sulphuric acid, alcohol &c. If this compound is not quite colourless, it is to be allowed to congeal, and treated with concentrated sulphuric acid; then, in order to purify it, it is to remain long in a warm place.

The properties of paraffin are, that at common temperatures it is hard, crystalline, perfectly white, inodorous, tasteless, brittle, its touch like that of cetine, ductile, but not easily uniting, streak greasy, a nonconductor of electricity, loses no sensible weight during months of exposure to the air, melts at about 111° F. into a colourless, transparent, oleaginous fluid, boils at a higher temperature, and afterwards evaporates in white vapour, suffers no change by distillation, and leaves no residue, becomes coloured only when combined with other organic substances. By the flame of a taper it fuses without burning; when heated in a platina spoon until it begins to evaporate, it will inflame in the candle, and burns with a pure

white flame without soot or residue. A match made with it, burns like a taper, without smell; bibulous paper rubbed on it does not absorb it; at common temperatures it has not a greasy feel. Its density is 0.870.

It has already been stated, that paraffin is so named on account of its indifference or slight affinity for other bodies. The following have not the least effect upon it: chlorine, whether in the state of gas or of solution; sulphuric, muriatic, nitric, acetic, oxalic, and tartaric acids; solutions of potash, ammonia, lime, barytes, strontian; the alkaline carbonates hydrate of lime, potassium even in fusion; deutoxide of lead and peroxide of manganese. Sulphur, phosphorus, and selenium do not fuse with paraffin; when mixed with it after having been fused, it appears to take up only a very small quantity. It does not combine by fusion with camphor, naphthaline, benzoin, nor pitch, but unites well with stearine, cetine, bees' wax, and colophony. Lard and suet melt with it, but separate on cooling. Olive oil, when cold, dissolves paraffin imperfectly, but readily when hot; oil of almonds acts more slowly. The oils of turpentine and tar, and naphtha, dissolve it readily, even when cold; 100 parts of ether dissolve 140 parts of paraffin at 77° F.; at a rather lower temperature it congeals into a white crystalline mass. Absolute alcohol dissolves but little when cold, and even this little is precipitated by water; alcohol when boiling dissolves only 3.45 per cent. of its weight, and the solution congeals on cooling. Test papers are not altered by the spirituous solution.

Paraffin appears applicable to several useful purposes. It gives better light than wax, and improves spermaceti for candles; it may be extremely useful as a cement, because it is not acted upon either by acids or alkalies; it may also serve to grease carriage wheels, &c.

Eupion is best prepared by the following process:—Put into an iron retort 14 pints (imperial) of fresh rough animal tar, prepared from flesh, bones, hoofs or horns, and draw off 8½ pints; redistil and draw off only 5½ pints; shake it carefully, and by small portions, with 18 ounces (avoirdupois) of sul-

phuric acid. By this there are obtained a red solution, and a subtile transparent liquid of a bright yellow colour; the latter being separated, is to be mixed in a retort with an equal weight of sulphuric acid, and three fourths are to be distilled. The colourless product is to be washed with a solution of potash, and after being some time digested, the oil is to be separated and again distilled with half its weight of sulphuric acid; distil again, wash with a hot solution of potash; decant, and then distil very slowly with pure water until three fourths pass into the receiver;—there then remains some paraffin still mixed with the eupion. The distilled eupion is to be put over sulphuric acid in the air pump for twenty-four hours; it is then to be distilled with a few grains of potassium, which occasions it to deposit some brown flocks of a red brown colour, which are to be separated; when after repeating this treatment it is no longer rendered turbid, but leaves the potassium of a metallic whiteness, it is to be decanted; it is not pure unless it burns without smoke, and its density exceeds 0.740. The eupion is separated from the paraffin either by distillation with a large quantity of water, because it is rather more volatile than paraffin; or by spirits of wine, in which paraffin is insoluble; or by extreme cold, which makes it crystallize. The distillation with water, when only the first portions are received, renders it entirely free from paraffin. By the processes which have been described, and with slight modifications, eupion is obtained from vegetable tar, and paraffin from animal tar.

The properties of eupion are the following: colourless, transparent as water, liquid even at 4° F., tasteless, inodorous, unalterable in the air, is a nonconductor of electricity, has no effect upon litmus or tumeric papers, is as fluid as absolute alcohol, forms drops at 68° F. 0.296 of the size of those of water, spreads very readily on glass, but rises in a glass tube only to 0.6207 of the height that water does, forms a spot upon bibulous paper, which disappears in time, but more readily when heated. Its density is 0.740; from 66° F. to 336° , increases about one fifth, boils at 336° , and volatilizes if it be pure. It does not inflame in a cup by a taper, but

readily when heated in a platina spoon, is readily fired by a match, with a bright flame without smoke, even when the flame is as long as the hand.

Eupion is perfectly insoluble both in hot and cold water; 100 parts of absolute alcohol at 65° F. dissolve 33 parts; but on cooling, a great part of the eupion separates. These two fluids, when hot mix in all proportions. Ether mixed with a tenth of eupion forms a clear solution, but with five times that quantity it is turbid; it becomes clear, however, on standing, during which water evaporates from the ether: acetic ether dissolves about one third of its weight of eupion: sulphuret of carbon, oil of turpentine, naphtha, oil of almonds and of olives, readily mix with this fluid even when cold. Eupion, when cold, readily dissolves chlorine, and bromine still more so; but heat separates these bodies without altering it. Iodine dissolves in it even in the cold with its violet colour, and much more readily when hot, and on cooling it crystallizes in part. Phosphorus, selenium, and sulphur dissolve readily in eupion when heated, but not when cold; on cooling, the two former precipitate totally, and the latter partially. Naphthaline, camphor, stearine, cetine, cholesterine, paraffin, and balsam of copaiba dissolve in it in the cold, and much more so when hot. Tallow dissolves in it at 80° F., but at 68° the solution becomes clotted, probably the stearine separates, and the elaine remains in solution. Bees' wax dissolves in eupion when heated, but the greater part separates on cooling. Colophony is partially soluble in the cold, but perfectly at a boiling heat. Benzoin, gum anime, copal, and gum lac, dissolve only partially at a boiling heat, and they precipitate either totally or partially on cooling. Caoutchouc swells in eupion in an extraordinary manner, yet does not dissolve in it in the heat of a stove, but readily at a boiling temperature. The solution does not dry by exposure to the air. Heated upon a plate of glass in a stove, it soon becomes adhesive, may be drawn into threads, and eventually dries. The caoutchouc remains as a brittle varnish, which may be scraped off in small scales like dried gum or varnish.

The following substances have no action upon eupion: con-

centrated nitric acid, concentrated sulphuric acid, muriatic, acetic, oxalic, tartaric, succinic, and citric acids; potassium, hydrate of potash, hydrate of lime, solutions of potash, lime, barytes, strontian and ammonia; the carbonated alkalies, deutoxide of lead, peroxide of mercury, peroxide of manganese, oxide of copper, bichromate of potash.

Eupion is an excellent substance for keeping potassium in, probably also for separating stearine for elaine; and is a most remarkable substance for giving light by combustion, giving no soot even when mixed with paraffin.—*Ann. de Chim et de Phys.* l. p. 69. & *Phil. Mag.*

Analysis of Paraffin.—M. Jules Gay-Lussac has analyzed this substance by means of oxide of copper, and obtained such quantities of carbonic acid and water as showed that it consisted of

Carbon	85.23
Hydrogen	14.99
	<hr/>
	100.22

These, he remarks, are in the same proportions as form olefiant gas; and he considers this compound as equivalent to one atom of carbon and two atoms of hydrogen; but adopting the atomic weights usual in this country, it is a compound of one atom of each, or of

Carbon	6	85.7
Hydrogen	1	14.3
	<hr/>	<hr/>
	7	100

Ann. de Chim. et de Phys. tom. xlix. p. 30. & *Phil. Mag.*

ART. XIV.—On *Lactucarium* and *Thridace*.

By A. CHEVALLIER.

THE use of the *LACTUCA sativa* in the healing art is very ancient, and may be traced back to Hippocrates: but like many other remedies, this article was successively employed and abandoned. At present two products are obtained from the

lettuce, viz. *lactucarium* and *thridace*. One of these, the *lactucarium*, was examined by Dr. J. R. Coxe, of Philadelphia, in 1792; the other has since been investigated by several French practitioners, who are by no means in unison as to its properties. This discrepancy may have arisen from the confusion which exists in the names applied to products which are not identical, and which are endowed with different properties. Thus Dr. Francis has given the name of *thridace* to the *lactucarium* of the English practitioners, which is a solid, flexible or frangible product, obtained by evaporation in the open air, of a white, bitter, viscous juice, which flows from incisions made in the stem of the lettuce, when it has acquired its full growth; whilst other practitioners have given the same name to an extract obtained by pounding lettuce leaves or stems, to obtain a juice, which is first formed into an extract, and then dried.

It may readily be supposed that these two products do not possess the same properties, and in fact, that they are wholly dissimilar. Whilst the juice which is concentrated by the air is very bitter, and has somewhat of the virous smell of opium, that obtained by expression &c. has very little bitterness, and even is sometimes salt. It is therefore necessary, that in future a distinction should be made between them. Hence it is better to retain the name of *lactucarium* for the concrete product obtained by spontaneous evaporation, from the white viscid juice that flows from incisions made in the *LACTUCA sativa*, and to give the name of *thridace* to the product of the evaporation of lettuce juice by means of heat.

In a letter from M. Baumann, of Saverne, he gives the following details: "I send you some *lactucarium*, which I procured by a very simple and easy method, as in six hours I was able to collect ten drachms of a product similar to that transmitted to you. This is not entirely soluble in water, forming an emulsion with that fluid. If this emulsion is permitted to remain undisturbed for some time, part of the product falls to the bottom; this when exposed to heat, burns like wax, leaving a carbonaceous residue.

M. Baumann's plan of procuring the *lactucarium* is as fol-

lows:—He cuts a quill in the form of a toothpick, which is passed through the cork of a wide mouthed bottle; he makes incisions in the lettuce, and collects the juice which exudes by means of the quill, which permits it to run into the bottle; this is then exposed to the heat of the sun, which evaporates the water and solidifies the lactucarium. The lettuce plants which have been punctured may be kept for the purpose of seed, as this operation does not prevent their producing as perfect seed as if they had not been wounded.—*Journ. de Chim. Med.*

ART. XV.—*On the Composition of Tartar Emetic.*

By R. BRANDES and C. WARDENBERG.

TARTAR EMETIC has often been subjected to chemical examination, but the results are by no means in accordance with each other. To settle this question the following experiments were made. The tartar emetic employed was prepared with very pure supertartrate of potassa, formed by adding an excess of tartaric acid to pure carbonate of potassa, dissolving in water and crystallizing. The oxide of antimony was prepared by treating metallic antimony with *aqua regia*, precipitating the solution with water and washing the precipitate with a weak solution of carbonate of potassa.

A first operation afforded from 740 grains of supertartrate of potassa and 478 grains of oxide of antimony, 1104 grains of crystallized tartar emetic. A second trial with 148 grains of supertartrate of potassa and 11.975 of oxide of antimony gave 259.5 grains of crystallized tartar emetic.

The analysis were made first on part of the tartar emetic of the first operation; second on another portion of the same; third on that of the second operation.

To determine the proportion of water, the salt was heated by steam, and afterwards in a sand bath. The quantity of oxide of antimony was determined by means of sulphuretted hydrogen. The sulphuret of antimony thus obtained, was washed with boiling water, then dried, and gradually

heated to redness. The quantity of anhydrous sulphuret served to determine that of the oxide.

The solutions still contained some sulphureted hydrogen; this was driven off by heat, and the fluid evaporated slightly, the excess of acid saturated with ammonia, and the tartaric acid precipitated by acetate of lead. The tartrate of lead thus formed was dried by heat, which was prolonged as much as possible, without decomposing the salt; the weight of this latter gave that of the tartaric acid.

The oxide of lead remaining in the solution was precipitated by sulphuric acid; the solution was then evaporated, and the product subjected to a strong heat; the quantity of the salt obtained was sensibly greater than was expected; but on dissolving it the reason of this became evident; namely, the sulphate of lead not being wholly insoluble in the acids; in fact, the solution became turbid, and deposited a small quantity of the sulphate of lead. Carbonate of ammonia was then added, the mixture filtered, evaporated to dryness, and the residue exposed to a red heat; when its weight served to determine that of the potassa.

The three analyses gave the following results on 100 grains of tartar emetic:

	I.	II.	III.
Oxide of antimony	43.2508	43.1825	43.0464
Potassa	13.7878	13.5174	13.6258
Tartaric acid	37.7257	37.7706	37.6821
Water	5.2357	5.5295	5.6455
	<hr/> 100.000	<hr/> 100.000	<hr/> 100.000

The mean of these three analyses gives

Oxide of antimony	43.1599
Potassa	13.6346
Tartaric acid	35.4643
Water	5.4412
	<hr/> 100.000

Hence the composition of this salt, as also stated by Dulk, may be represented as follows: $\text{K}^{\text{T}} \text{S}^{\text{B}} \text{T} \cdot 2 \text{H}$. and its atomic weight 4389.194.—*Journal de Pharmacie*, Sep. 1832.

ART. XVI.—*Remarks on the Euphorbia hypericifolia.* By
WILLIAM ZOLLIKOFFER, M. D. of Baltimore.

THIS vegetable production, which is exclusively a native of the United States, arrested my attention in the year 1819; since that time my mind has not unfrequently been directed to an investigation of its therapeutic operation, and, in a very great number of instances, I have been delighted with the efficient displays of its curative influence in diseases which had previously resisted the use of the ordinary astringents, administered alone, and in association with opium; a circumstance that doubtless is attributable to some peculiarity in its mode of action, depending upon certain elements that exist in its composition, as furnished by nature, which, although individually inert, confer additional strength and impulse upon the principles of activity with which they are associated, that cannot be successfully effected by any attempt of art in imitation of the combined powers which it displays, aided by the application of the most minute knowledge in the possession of the profession, in relation to the important principles of medicinal combination.

Kino and catechu, with many other vegetable astringents which I have often prescribed individually and in conjunction with narcotics, in the maladies to which the separate and conjoint exhibition of these remedial articles are often competent to the production of the happiest results, sink into comparative insignificance when viewed with the successful impressions which accompany this plant in its modes of action, and in its ultimate consecutive displays, in accomplishing the important objects of its internal administration.

Medicinal consociations which are required to obviate different symptoms, or answer different indications, but by modes of action altogether opposed to each other, it is well known, should, in many instances, be had recourse to, in order to enable the physician to manage particular diseases with which he has to combat, with dexterous ability, with determinable promptness, and with ultimate success. Cases illustrative of

this position can very readily be adduced in attestation of the assertion, and in demonstrative elucidation of the nature and importance of such combinations. The following one will doubtless be considered sufficiently competent of itself for the establishment of this declaration. "In diarrhœa, an astringent, properly so called, diminishes the flow of those acrid fluids into the intestines, by which their peristaltic motions are preternaturally increased, and it consequently represses the diarrhœa; a narcotic under similar circumstances might not repress the flow of acrid matter to which I have alluded, but it would render the bowels less susceptible to its stimulus, and would therefore produce the same apparent alleviation, although by a very different mode of operation." It will readily be perceived that the restraining influence of the astringent is here displayed by the corrugating and consequent condensing power that it exerts on the intestinal canal; while the effect of the narcotic in diminishing the irritability of the intestinal organs, and subsequently checking the diarrhœa, is the result peculiar to its operation in allaying the sensibility of the sentient parts of the animal economy. By a consociation of these two agents, the practitioner avails himself at once of an important and decided advantage, in arresting the progress of this excessive evacuation, not only with the more promptness, than by the single administration of an astringent, but with the more certainty of preventing its immediate return; for the narcotic diminishing the quickness of the sensation of the bowels to the action of the acrid secretions, which are checked by the operative influence of the constringent agency of the astringent, until these secretions pass off by the rectum, greatly facilitates the effects of the latter medicinal substance, by its display of action in this way upon the sensibility. An astringent exhibited alone would be calculated to check the inordinate secretions, but these secretions would be reproductive of the diarrhœa, as a consequence of their irritating operation on the bowels; hence the necessity of the combined use of the remedies of the classes to which they belong, in order to insure the successful management of the malady that is here selected as the subject of illustration, in order to demonstrate

the nature and importance of medicinal combinations. It is to this double play in the remedial action of a narcotic associated in native combination with a powerful astringent, in the character of the *EUPHORBIA hypericifolia*, that gives to it the superiority it possesses over other analagous remedies, effected by medicinal combination, with a view of producing similar consequential results.

The *EUPHORBIA hypericifolia* delights in a rich and prolific soil, and is an inhabitant of gardens and other fertile situations. It is recognized by the common and local appellations of black pursely, milk pursely, milk weed, &c. MICHAUX, who doubtless was acquainted with its botanical character, has favoured the medical profession with the following description of its specific difference, by which it can very readily be ascertained from any other individual belonging to the genus *Euphorbia*. "*EUPHORBIA hypericifolia*; glabra, dichotome, ramossissima, erectiuscula-patula, ramis divaricatis, foliis oppositis, subfalcato-oblongis, argute serratis; ramusculis in summitate fasciculatim multifloris."

This species of *Euphorbia* is an annual plant that grows to the height of a foot, and is rather procumbent. It has a smooth stalk, which is repeatedly forked with divaricated branches. The leaves, which are opposite and oblong, are somewhat falciform and deeply serrated; these are often covered with purple spots. The flowers, which appear in August and September, are white, and situated in numerous quantities on the extremity of the small branches. This plant, of which I perceive there is another variety, belongs to the 11th class, dodecandria; the third order, trigynia, and the natural order, Tricoccæ of LINNÆUS, and *Euphorbiæ* of JUSSIEU.

Being rather dissatisfied with the result of a former chemical examination of this plant, I concluded to extend my investigation upon this subject somewhat further. I digested several portions of it, after having previously reduced it to a state of pulverization, in sulphuric ether and alcohol. The ethereal solution gave a precipitate upon the addition of alcohol. The alcoholic preparation assumed a pearly turbidness when water was added. Both the ethereal and alcoholic solutions upon

being evaporated, afforded a residuum that burnt with great vividness, and exhibited a flame much like that resulting from the combustion of spirits of wine. The infusion and decoction that were prepared from distilled water produced a copious precipitate when gelatine was added, and assumed a dark blue colour on the addition of the sulphate of iron. From these results we may justly infer, that the chemical composition of this plant consists of caoutchouc, resin, tannin, and gallic acid.

To the organs of gustation this vegetable substance produces an impression somewhat different from all of the other species belonging to the genus *Euphorbia* hitherto known. Its taste is sweetish; this is immediately succeeded by a sensation of harshness and roughness imparted to the palate, being too peculiar to be mistaken by even the most ordinary observer, who has ever attempted to eat a green persimmon. In its remedial character, it likewise differs very considerably from any other individual belonging to the same family of plants; so much so, that it seems to have been the prevailing opinion among practical and experimenting botanists, that all the species included in this extensive genus, *euphorbia*, possessed acrid and irritating qualities.

Relating more particularly to the therapeutic displays of the article that is the subject of this communication, I shall commence the notice of the diseases in which it has been exhibited with advantage, by first introducing dysentery as one of the examples in attestation of the remedial operation it exerts on the animal economy in removing diseased action, and in restoring the healthy condition of parts that are deranged in consequence of morbid excitement.

In this malady, when the true dysenteric symptoms have continued, after the inflammatory diathesis had been removed, by appropriate antiphlogistic means, I have been more successful with the use of this remedy, than with the conjoint administration of the ordinary astringents with narcotics. The evacuations have very soon become changed, both as relates to their character, condition and frequency; and the other unpleasant concomitant symptoms subside in a degree com-

mensurate with the recession of the unfavourable appearances of these evacuations. In most of the cases which I have treated with this remedy, I have been able to effect their removal in the course of forty-eight hours. In the primary stage of dysentery, I have never given it a trial, from a persuasion, that remedies of this kind are in direct contravention to its successful management.

The manner in which I have generally directed the *EUPHORBIA hypericifolia* to be used, is in the form of infusion, of the following strengths.—*R. Euphorbia hypericifolia folionem exsiccat. ʒss.* To be infused in a pint of boiling water for half an hour. In dysentery I mostly direct a table spoonful to be given every hour until the morbid symptoms begin to yield; and then to be used less frequently. In diarrhœa, this quantity should be taken after every evacuation. The quantity that I have used in menorrhagia and fluor albus, is that of a wine-glassful morning, noon, and at night. I have said nothing of the dietetical plan to be pursued in consociation with the administration of this plant, because this part of the management of the cases noticed in this communication, is always regulated by the knowledge the practitioner has in relation to the *materia alimentaria*.—*Amer. Jour. of Med. Science.*

MINUTES OF THE COLLEGE.

Nov. 27, 1832. The Board of Trustees reported the election of Isaac Jones Smith, as a resident member.

Dec. 25, 1832. The Board of Trustees reported the election of Richard M. Reeve, as a resident member, and Dr. James Cook, of Fredericksburg, Va. as an associate member.

The following resolution was adopted.—That all resignations from the Board of Trustees be presented to that Board, and referred to the College for acceptance.

In December 1831, a Committee of fifteen members was appointed, of which the president was chairman, to examine the several departments of the United States Pharmacopœia. This committee, through their chairman, made the following summary report:—

To the Philadelphia College of Pharmacy.

The chairman of the committee appointed to examine the American Pharmacopœia &c., reports that soon after their appointment that committee met and divided itself into subcommittees, assigning to each member some particular department of the Pharmacopœia, to which his labours were to be more particularly directed.

The resolution of the college, under which the committee stands appointed required that the reports of these subcommittees should be made to the chairman in the Ninth month, (September,) and that he should lay before the college at its present meeting a summary or digest of them.

In Medicine. To this requisition the chairman states, that he has only received reports from seven members, viz.: from Elias Durand, on syrups, honey and confections, and from Edward Needles, Wm. Hodgson, Jr., Thos. M'Clintock, Jos. Scattergood, Dillwyn Parrish and D. Stewart of Baltimore, on miscellaneous subjects which have attracted their attention. From the other members of the committee no reports have been received, although the pages of our Journal prove that the attention of several members of the committee of the college, has been directed to the subject.

In examining the reports which have been submitted, the chairman has felt some embarrassment as to the course which he should pursue in preparing this report. The subjects of remark in these communications are various—some of them relate to actual experiments, of which the results are given; some of them are the mere opinions of the writer, on the value of formulæ, and some are suggestions respecting the introduction of new preparations. As it might seem invidious in me to give my own opinion in opposition to, or judgment upon the opinions of others, I have concluded to lay before the college the original reports, and to content myself with pointing out those parts which appear to be the result of actual experiment.

The communication of Joseph Bringham cannot be considered as an examination of the pharmacopœia, although sent to the committee in consequence of the allotment to him of the department of the tinctures. Yet it is a report valuable in itself, and being accompanied by specimens of the extracts obtained, deserves particular notice and praise. Experiments of this kind, carefully conducted, are greatly to be desired, on all the details of pharmacy. He has given in relation to thirteen articles of the materia medica, the proportion dissolved by strong or diluted alcohol, and the increase of weights in the liquid, and the amount of extract which the tinctures thus prepared yielded.

The communication from our corresponding secretary, Elias Durand, gives the result of his experience in the preparation of syrups, to be in favour of employing the diluted tinc-

ture of medicinal substances, which are to be evaporated till the alcohol is nearly exhausted, and then mixed with the syrup previously prepared. The advantages of this mode of operation are obvious, but as the strength and qualities of the syrups thus prepared, must differ from those made in the ordinary method, it is respectfully suggested, that no opinion should be given by the college, on their comparative merit, without full and elaborate trial, both as to the best manner of preparing each syrup, and its medicinal qualities when prepared.

It is said in the same communication, that honey is decidedly preferable to sugar in the formation of conserves, on account of the liability of the latter to crystallize. The observation is no doubt correct, and may lead to improvements in the formula for these compounds.

The ointment of rose water is found by our secretary to be too hard, and he gives the following as the recipe used by himself, and as one of much better consistence:

Aq. Rosar	12 parts.
Ol. Amygdal D.	16 parts.
Spermaceti	4 parts.
Cera Alba	1 part.

In the communication from Edward Needles, are some valuable remarks on the preparation of Emplastrum Assafœtida. The pharmacopœia directs the gum resin to be melted and strained, which it is not easy to effect. Our colleague macerates it in boiling water, so as to dissolve it, and pass it through a strainer; the watery solution is then evaporated to the consistence of syrup, and thoroughly mixed with the melted plaster. He extends the same method to the preparation of Galbanum plaster, and observes that the plasters thus made spread smoothly and easily.

He also observes, that the pharmacopœia is deficient in not directing the mode of preparing the pulp of Cassia, in the confection of Senna.

The report of Wm. Hodgson, Jr. notices a defect in the mode of preparing Extract of Jalap, which must have struck

all who have tried it. The boiling water directed to be used, dissolves the feculæ, and renders the process of straining extremely difficult. By infusing instead of boiling the root, this inconvenience is avoided, and the appearance and quality of the extract is much improved. His remarks on the *Mistura Ferri*, and on the preparation of *Morphia*, are valuable, and he points out the circumstances, by an attention to which, nearly all the narcotine can be separated from the salts of morphia, in the course of their preparation.

He also notices the difficulty of preparing the *Assafoetida* plaster by the officinal rule, and proposes to dissolve the gum resin in diluted alcohol, and afterwards to proceed in the same manner as is proposed in the report of Edward Needles.

Thomas M'Clintock, in his report, observes very judiciously, that the strengthening plaster of the pharmacopœia is liable to many objections. He proposes as a substitute, a composition nearly similar to the *Emplastrum Thuris*, of the Dublin college, which is one of the best preparations of the kind in use.

His remarks on the adhesive plaster and warm plaster, will be found judicious and interesting.

In the report of Dillwyn Parrish, he states, that he has found the *Ceratum simplex* becomes inconveniently hard in cold weather, and that he has found the following to be a formula better adapted to our climate:—

R. Axung.	℥ix
Cera Alb.	℥iij M

The communication from D. Stewart, of Baltimore, relates to the preparation of syrups of *Rhubarb*, respecting which I have already spoken.

In thus confining myself as nearly as possible to the selection of matter of fact criticism and experiment, I have been guided by the belief that the College of Pharmacy, however it may respect the opinions and suggestions of its members, will not accede to any change in the pharmacopœia without the most satisfactory proof that it is founded on just principles and actual experience, without subjecting the proposition to

the test of new experiments in the hands of a competent committee. The peculiar department of the college in this inquiry appears to me to be strictly pharmaceutical; the virtues of preparations—the strength of which it is most convenient or proper to compound them, although we are much interested in these points, lie in the more peculiar department of the medical profession. Although the views and suggestions of members on these subjects are interesting, yet it is respectfully suggested that the college abstain from acting upon them at the present stage of the business.

How far the Pharmacopœia is deficient as a complete code of pharmacy, is another point of great interest to the college. With every successive revision, and with the progress of pharmaceutic science in our country, it will, we trust, become more and more complete in this respect. In the meantime, something seems due to ourselves in relation to those formulæ which are not contained in it, and it is therefore proposed to appoint a committee to select and recommend to the college for adoption such formulæ, not contained in the Pharmacopœia of the United States, as they may judge useful from the Pharmacopœias of Europe.

It is further proposed to refer the reports herewith submitted to a committee, in order to select such parts thereof as they may deem useful, and that those parts which relate to practical remarks on the formulæ and modes of preparation of the U. S. Pharmacopœia, be also referred to a committee to examine and report on the same; all of which is respectfully submitted.

DANIEL B. SMITH, *Chairman.*

A committee was appointed to examine those parts of the reports which related to practical remarks on the formulæ and modes of preparation of the U. S. Pharmacopœia, to whom, in conjunction with the professors in the school of pharmacy, was also referred the subject of selecting and recommending such formulæ, not contained in the U. S. Pharmacopœia, as they may judge useful.

Resolved, That the committee on the pharmacopœia ap-

pointed in 1831, be continued;—to report at the meeting in December 1833.

A resignation having occurred in the Board of Trustees by the resignation of JOHN CARTER, CHARLES MARSHALL was unanimously elected to fill his place.

January 29th, 1833. The Board of Trustees reported the election of CHARLES BONSALE, of Germantown, as an associate member.

February 26th, 1833. A communication from Dr. JAMES COOK, of Fredericksburg, Virginia, was read and referred to the publication committee.

MISCELLANY.

Transparent Caustic Potassa.—Professor Ducatel of the University of Maryland, has lately remarked an unusual appearance in the spontaneous formation of caustic potassa. In a well stopped vial, containing about an eighth of its capacity of naphtha, used for preserving a few globules of potassium, which had remained in the laboratory untouched for nearly a year, the whole of the metal was found transformed into a hydrated protoxide, perfectly transparent; so as to have been, at first inspection, mistaken for pieces of flint glass, which had accidentally fallen into the vial. The naphtha, which originally seemed very pure, has remained quite clear. It is not recollected that a similar fact is mentioned, as having been observed by any chemical writer.—E. D.

Chemical composition of vegetable acids.—M. Matteuci, in a memoir in the *Bibliothèque Universelle*. Juin, 1832, concludes :

1. That acetic acid is not altered by contact with sulphuric acid, and that it is not converted into formic acid, even by the addition of oxide of manganese.

2. That in contact with chlorine, and exposed to solar influence, acetic acid is converted into hydrochloric acid, and into oxi-carburetted chlorine gas.

3. That bromine exercises the same action, and consequently there is a formation of oxi-carburetted bromine gas, but iodine does not possess this property.

4. That oxide of carbon, in contact with copper, decomposes the water, forming acetic acid and oxide of copper.

5. Finally, that oxide of carbon may be considered as a combination analogous to cyanogen in forming to distinct acids.—*Journ de Pharmacie*.

Hydrocyanate of Quinine.—M. Pezzina gives the following plan for making this salt:—Triturate well a drachm of pure crystallized quinine in a glass mortar, adding gradually three ounces of medicinal hydrocyanic acid, of a specific gravity of 0.900. After half an hour of trituration the turbid solution is to be poured in to a glass stoppered vial and set aside for two days, shaking it well from time to time. The quinine will thus be almost all dissolved, and the solution is to be filtered, when

it will be of a straw colour, having a strong smell of hydrocyanic acid, but having no action on litmus paper, its specific gravity will be 910. Each ounce contains twenty grains of quinine. It should be observed, that the trituration must be performed at a low temperature, keeping the mortar surrounded with ice, so as not to permit any disengagement of the hydrocyanic acid by the heat produced by the friction of the pestle. This preparation should be preserved with the same care as hydrocyanic acid. The dose is from ten to twelve drops.—*Journal de Chimie. Medicale*, Sept. 1832.

Note on the Crystals formed in Oil of Cubebs. By M. MULLER, Aix-la-Chapelle.—Vauquelin long since noticed among the constituents of Cubebs an almost concrete volatile oil, and the existence of crystals in it has been pointed out by Teschemacher, and their forms determined by Brooke. Their dominant form appeared to him to be a rhomboidal octahedron; but the chemical properties of this substance have not been investigated until undertaken by M. Muller.

This chemist, in distilling two pounds of powdered cubebs, obtained about two ounces of a thick and turbid oil, which became clear in a month, and deposited a white precipitate. It still, however, retained the consistence of a fixed oil. In attentively observing the deposit, he observed that it had a crystalline appearance; he decanted the oil, and treated the mass with alcohol, which effected a complete solution. By the spontaneous evaporation of this latter fluid, crystals were formed, some of which were a quarter of an inch in length. They had the following properties: they were in transparent quadrilateral rhomboidal tables, had a slightly pungent taste, and a smell of cubebs, which appeared to depend on the presence of some of the essential oil.

When heated over a spirit lamp they soon melted; at a higher temperature the liquid began to boil, and finally volatilized in the form of thick white smoke, which, on cooling, gave rise to crystals. They are readily soluble in alcohol, and the solution is neither acid nor alkaline. Sulphuric ether dissolves them as easily as alcohol; cold water has no action on them, but when heated in contact with that fluid, they are changed into oleaginous drops, which crystallize on cooling. They dissolve rapidly in spirits of turpentine, as well as in fixed oils, especially with the aid of heat.

Diluted acetic acid when cold has no action on them, and if heat be applied they melt, but are not dissolved. When they are agitated with concentrated acetic acid, they afford a solution, which is at first limpid, but on the addition of more crystals the solution becomes turbid, and oleaginous drops are separated which rise to the surface, preserving their liquid form for a long time; if the acid, however, be neutralized, crystals are rapidly formed.

Liquid ammonia and a solution of caustic soda, unaided by heat, have no action on these crystals; but if the mixture be heated and shaken, a turbid liquid is formed, which, on cooling, deposits the substance in a crystallize form.—*Annalen der Pharmacie and Journal de Pharmacie.*

Protocarbonate of Iron.—According to Moldenhawser, the following process will afford a protocarbonate of iron of excellent quality: A solution of pure protosulphate of iron is to be mixed with a solution of carbonate of ammonia as long as any precipitate is formed, and the bottle in which it is made must be filled to the neck with boiling distilled water. When the precipitate has perfectly formed, the supernatant fluid is to be decanted, and the precipitate washed several times with distilled water, and afterwards put in a strong linen cloth, previously moistened with ether so as prevent any developement of caloric that might favour the super-oxidation. The whole is then submitted to the action of a press, and the distillation perfected in vacuo. The carbonate resulting from this process is of a whitish green.—*Geiger's Mag.* 30, and *Journ. de Chim. Med.*

Protocarbonate of Iron.—Folix has given another process for this preparation. Several parts of protosulphate of iron are to be dissolved in pure water; this solution is then to be boiled for some time with iron filings to separate all the peroxide; it is then to be filtered through a covered funnel into a bottle with a long neck; and four parts of pure carbonate of potassa dissolved in boiling water must be added to the clear solution, and the bottle being afterwards filled with pure boiling water and closed. When the whitish gray precipitate has fully formed, the fluid is to be poured off and the precipitate rapidly transferred to another bottle containing boiling water, which is to be immediately corked. This operation is to be repeated as long as the water retains any taste; the precipitate is then to be washed with alcohol, the introduced into a small tubulated retort, to which is to be adapted a strong bottle having a narrow neck. By means of water almost at the boiling point, or what is better, by a spirit lamp, a portion of the air in the bottle is driven off, when the apparatus is to be luted, a gentle heat is now to be applied to drive off the alcohol. The bottle should be cooled from time to time with water. The protocarbonate of iron thus obtained is of a blackish green, insipid, soluble in the acids, particularly in the hydrochloric, with great effervescence. Thirty grains of this product contain nine grains of carbonic acid, whilst that prepared according to the process of Buchner does not contain more than four grains. Even exposed to the action of the air, it retains its colour for a long time.—*Brandes. Archiv.* 37, and *Journ. de Chim. Med.*

Caustic Potassa.—The best method of preparing this article, according to J. Liebig, is to dissolve the carbonate of potassa in at least ten parts

of water. According to Berzelius, the lime should be added very gradually, waiting till each portion is changed into a sandy dust, which precipitates. If the above mentioned quantity of water be used, (and more would be better,) at least two parts of quicklime to three parts of carbonate of potassa are to be employed.*—*Journ. de Chim. Med.*

Creatine.—M. Chevreul has given this name to a new substance, which he has discovered in the flesh of animals. It is white, inodorous, insipid, crystallizes in small cubes, which are aggregated like those of the chloride of sodium. It has no action on litmus or syrup of violets, is insoluble in alcohol, soluble in water, and sulphuric acid. It is decomposed by heat, affording ammoniacal products, and a smell of hydrocyanic acid. This principle is obtained from the aqueous extract of meat, treated by alcohol, which dissolves the salts and osmazome. It remains mixed with an extractive matter, from which it can be separated by crystallization. It exists in flesh in a very small proportion, and although insipid, it appears to communicate a pleasant sweet taste to the extract of meat.—*Journ. de Chim. Med. Sept. 1832.*

New Adhesive Plaster.—M. Deschamps of Avallon, states that the following adhesive plaster is better than the resinous for the purpose of closing wounds, &c. It is prepared by fixing a piece of fine muslin, silk or linen, to a table, and giving it a thin coat of flour paste; when this is dry two coats of colourless gelatine are to be applied. It is only necessary to moisten this adhesive plaster to enable it to stick with great firmness. The inventor states that court plaster prepared in this manner, is far preferable to any other.—*Ibid.*

Morphia.—A pharmacist, at Venice, of the name of Galvini, has given the following method of obtaining pure morphia. A pound of powdered opium is to be subjected to five successive infusions: 1st, in alcohol, at 36°; 2nd, in do. at 24°; 3rd, in do. at 20°; 4th, in do. at 18°; and 5th, in boiling water. The five infusions are added together, filtered and distilled to separate the alcohol; the liquid, when thus reduced to two pounds, is to be united to an equal quantity of water. The mixture becomes turbid and is to be filtered, which will separate all the resin as well as the morphia and narcotine. This resin is to be washed, and the united liquids are to be boiled for half an hour with three ounces of calcined magnesia. The liquid, when cold, is to be filtered and again boiled

* *Note.* The importance of the relative quantity of water, in producing the causticity of the potassa or soda, when made by lime, was noticed by Descroizilles. This ingenious manufacturer mentions in his treatise on alkalimetry, that the proper proportions for the potash and soda of commerce, marking 75° to 64°, are at least seven times the weight of water, and 0.4 at most (less than half their weight) of lime.

with another ounce and a half of magnesia. The two precipitates are added together and dried, and three times treated with alcohol at 40° . By this means an ounce of perfectly pure, crystallized, and almost colourless morphia is obtained.

The narcotine can be extracted from the resin by treating it with hot diluted sulphuric acid; the solution filtered and treated by a solution of potassa, gives a precipitate of impure narcotine, which is to be redissolved in sulphuric acid and precipitated by ammonia. The product, washed and dissolved in alcohol at 24° , will afford on evaporation crystallized narcotine.—*Ibid.*

Mode of depriving Alcohol of Odour.—This is by means of the manganate of potassa. This salt is prepared by melting a mixture of six ounces of pure nitrate of potassa and two ounces of peroxide of manganese in a crucible. When cool, the mixture is put in a still with twenty-five measures of brandy or other alcoholic liquid, heat applied, when the product obtained will be entirely without smell.—*Ibid.*

Chlorides of Sulphur.—Thompson was the first who discovered the combination of chlorine and sulphur in 1802, since which, Berthollet, Jr., Bucholz, Davy, Henry Rose, &c. have occupied themselves with this compound, which is sometimes red and sometimes yellow. Notwithstanding this, a majority of chemists recognise but one chloride of sulphur, although Rose had stated that the red chloride contained an excess of sulphur. To determine this question M. Dumas prepared the two chlorides in a state of the greatest purity in order to analyse them, and obtained the following results:—

Yellow Chloride.—This must be considered as a protochloride composed of

Sulphur, 1 atom	201.16	47.6	
Chlorine, 1 atom	221.32	422.48	52.4 100

or,

1 volume vapour of sulphur	2.218	} 1 volume of protochloride 4.658.
1 volume of chlorine	2.440	

Red Chloride.—This must be considered as a bichloride composed of

Sulphur, 1 atom	201.16	31.2	
Chlorine, 2 atoms	442.64	643.80	68.8 100

or,

$\frac{1}{2}$ volume vapour of sulphur	1.109	} 1 volume of bichloride 3.549.
1 volume of chlorine	2.440	

The bichloride of sulphur corresponds to the hyposulphurous acid; but the protochloride has no analogy to any known compound of sulphur with oxygen.

M. Dumas has ascertained that these two chlorides absorb ammoniacal gas, and that one of them is thus converted into a purplish powder.—*Ibid.*

Protoxide of Azote.—M. Serullas gives the following method of preparing a solution of protoxide of azote, which has been recommended as a diffusible stimulant of great power.

A certain quantity of crystallized nitrate of ammonia is to be introduced into a vial, to which a curved tube is to be adapted; the vial is then to be heated, when the gas will be extricated; the free end of the tube is then to be introduced under a bottle filled with water and reversed; when this is about half filled with the gas, it is to be corked under water, removed and well shaken, again uncorked under water, and replaced over the tube. This is to be repeated until the water will absorb no more of the gas. The bottle is to be kept well corked.—*Journ. de Chime. Med.* July 1832.

New Manna from Australia.—One of the species of *EUCALYPTUS* produces a manna, whose remedial properties have been tested in New Holland. This substance does not appear to differ materially from that of the ash. It is, however, less nauseous. It is evidently the result of a rupture in the tissue of the bark of the tree, not induced by the punctures of insects, but by the action of the atmosphere, for it is only produced during the dry season, and the quantity depends on the degree and duration of the heat. After a long drought, it is to be met with in such abundance, on the ground, under the trees, that several pounds may be collected in a few minutes; but when the rainy season commences, it melts and disappears. The tree which furnishes this product, is but little known; it belongs to the natural order of *MYRTACEÆ*, and has received the name of *EUCALYPTUS mannifera*. It is found on elevated spots near the Blue mountains, and attains the height of from thirty to forty feet. Its trunk is of an irregular form, and has but few branches. As in all the other species of the genus, the leaves are simple, lanceolate and entire, and placed vertically, from the peculiar manner in which the branches are twisted.—*Courier des Etats Unis*.

Manufacture of Potashes.—At a late meeting of the Philomathic society, M. Becquerel mentioned some experiments he had made on the manufacture of potashes, at Charmes. The comparative analysis of a great variety of ashes, demonstrated to him, that those of green wood gain a much larger saline mixture of subcarbonate and sulphate of potassa. The proportion of the former varies from 0.45 to 0.65; it is this variation that causes the great differences in quality and price of the potashes of commerce. It is therefore of no slight importance, in the manufacture of potash, to separate the sulphate with which the subcarbonate is mixed. M. Becquerel has accomplished this, by concentrating the solution to 40° of Baume, and then letting it cool; the greatest part of the sulphate of potash crystallizes, and the salts remaining in solution contain 0.90 of subcarbonate. M. Becquerel has also ascertained, in his numerous analyses

of cinders of different kinds, that the ashes from lime kilns contain very little sulphate of potassa. This is no doubt owing to the action of the quicklime on the sulphate of potassa, through the intermedium of the charcoal. This fact, says M. Bacquerel, may be of some importance, and it may be found advantageous to sprinkle the wood intended to be burnt to make potash, with quicklime.—*Journ. de Pharm.* Oct. 1832.

Kermes Mineral.—M. B. Biozi has proposed the following method of preparing the kermes mineral: Take three parts of pure subcarbonate of potassa, boil them for half a hour with an equal portion of hydrate of lime and a sufficient quantity of water, observing, however, that the solution be reduced to one tenth of the water employed. The solution being filtered, seven parts are to be taken and the eighth reserved. These seven parts are to be diluted with a quantity of water equal to six times the weight of the carbonate of potassa employed. When the mixture begins to boil, add one part of sulphuret of antimony in fine powder, and twenty minutes afterwards filter the liquid; on cooling nothing is deposited; when distilled acetic acid is to be gradually added, the mixture being constantly stirred. The first precipitate formed is redissolved, but as the alkali becomes saturated the precipitate becomes more and more abundant. The kermes obtained by this first operation is in the form of a yellowish brown hydrate; the portion of the solution of potash which had been set aside is now to be added, and the mixture stirred; in twelve hours the kermes begins to assume its usual beautiful colour, when the solution is to be filtered and the precipitate well washed and dried.—*Journal de Chimie Medicale*, Sept. 1832.

Caoutchouc.—Few persons are perhaps aware of the comparatively late introduction of Indian Rubber into this country. The following notice is appended by Dr. Priestley to the preface to his *Familiar Introduction to the Theory and Practice of Perspective*, printed in 1770; and it will be observed that no name is given to the substance described: "Since this work was printed off, I have seen a substance excellently adapted to the purpose of wiping from paper the marks of a black lead pencil. It must therefore, be of singular use to those who practise drawing. It is sold by Mr. Nairne, Mathematical Instrument Maker, opposite the Royal Exchange. He sells a cubical piece, of about half an inch, for three shillings; and he says it will last several years."—*Phil. Mag.*

Peroxide of Barium.—The hydrated peroxide of barium employed to prepare peroxide of hydrogen, may be obtained, according to M. M. Wöhler and Liebig, with the greatest facility by the following process. Heat caustic barytes in a platinum crucible, by means of a spirit lamp, until it is nearly red hot, and then throw in, by small quantities at a time, chlorate of potash; incandescence takes place, and the protoxide becomes per-

oxide of barium. When the mass is cold, dissolve the chloride of potassium by solution in cold water; the peroxide becomes a hydrate during this operation, and remains in the state of a white powder. It may be dried by exposure to the air, without heat. It appears to contain six atoms of water.

The yellow oxide of lead, fused with chlorate of potash, is readily converted into peroxide. Green oxide of chrome, treated in the same manner, gives neutral chromate of potash, attended with a copious evolution of chlorine.—*Ann. de Chim. et de Phys.* tom. xlix. p. 30. & *Phil. Mag.*

Hydrate of Phosphorus.—M. Pelouze states, that this matter, which was supposed to be hydrated oxide of phosphorus, is white, insipid, and insoluble in water. Its odour is similar to that of phosphorus, and it is also luminous in the dark. Its density is 1.515 at 60° F.; when put into contact with cold sulphuric acid, it is decomposed, giving its water to the acid, and the phosphorus is set free.

At a temperature of 110° F. and even a little under, the hydrate of phosphorus decomposes also into phosphorus, which appears with all its physical and chemical properties, and water. It does not contain more oxide than phosphorus which has been distilled, and is perfectly transparent.

In order to determine the quantity of water contained in this compound, it was dried on filtering paper, and heated in a weighed tube placed in water heated to 112° F. The water was absorbed by paper, and found to amount to 12.53 per cent. A compound of four atoms of phosphorus and one atom of water would consist of

Phosphorus	87.48
Water	12.52
	<hr/>
	100.00— <i>Ibid.</i>

Improvement in the quality of Iron and Steel.—An eminent London cutler, Mr. Weiss of the Strand, to whose inventions modern surgery is under considerable obligations, has remarked, that steel seemed to be much improved when it had become rusty in the earth, and provided the rust was not factitiously produced by the application of acids. He accordingly buried some razor blades for near three years, and the result fully corresponded to his expectation; the blades were coated with rust, which had the appearance of having exuded from within, but were not eroded, and the quality of the steel was decidedly improved.—*Phil. Mag.*